



ANNUAL STATISTICS  
2019



## **Imprint**

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## Personnel 2019

### Directors

Prof. Dr. R. Bender, Optical and Interpretative Astronomy, also Professorship for Astronomy/Astrophysics at the Ludwig Maximilians University Munich

Prof. Dr. P. Caselli, Center for Astrochemical Studies (managing director)

Prof. Dr. R. Genzel, Infrared and Submillimeter Astronomy, also Prof. of Physics, University of California, Berkeley (USA)

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Dr. S. Gillessen

### MPG Fellow

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Dr. W. Collmar

### Press Officer

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### Curators (together with the MPI for Astrophysics)

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Dr. R. Breuer, former Editor-in-Chief of 'Spektrum der Wissenschaft', Heidelberg

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MdB F. Hahn, member of the Bundestag, Berlin

Prof. Dr. B. Huber, President of the Ludwig Maximilians University, Munich

Dr. F. Merkle, OHB System AG, Bremen

Dr. U. von Rauchhaupt, Frankfurter Allgemeine Zeitung, Frankfurt/Main

Prof. R. Rodenstock, Optische Werke G. Rodenstock GmbH & Co. KG, Munich

Dr. J. Rubner, Bayerischer Rundfunk, Munich

Dr. M. Wolter, Bavarian Ministry of Economy, Energy und Technology, Munich

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Prof. Dr. R. C. Kennicutt, University of Arizona, Tucson (USA) & Texas A&M University, College Station (USA)

Prof. Dr. K. Kuijken, Universiteit Leiden, Leiden (The Netherlands)

Prof. Dr. E. Quataert, University of California, Berkeley (USA)

Prof. Dr. G. J. Stacey, Cornell University, Ithaca (USA)

### Interdisciplinary Members of the Advisory Board

Prof. Dr. C. Cesarsky, Commissariat à l'Energie Atomique, France, Sacley-Paris (France)

Prof. Dr. J. Peacock, Universität Edinburgh (UK)

### Scientific Honours, Appointments

Bender, R.: Royal Astronomical Society Honorary Fellowship in Astronomy, London, UK, January 2019

Herrera-Camus, R.: Assistant Professorship at Universidad de Concepcion, Concepcion, Chile, March 2019

Förster Schreiber, N.M.: Honorary Doctor of Science, University of Bath, Bath, United Kingdom, July 2019

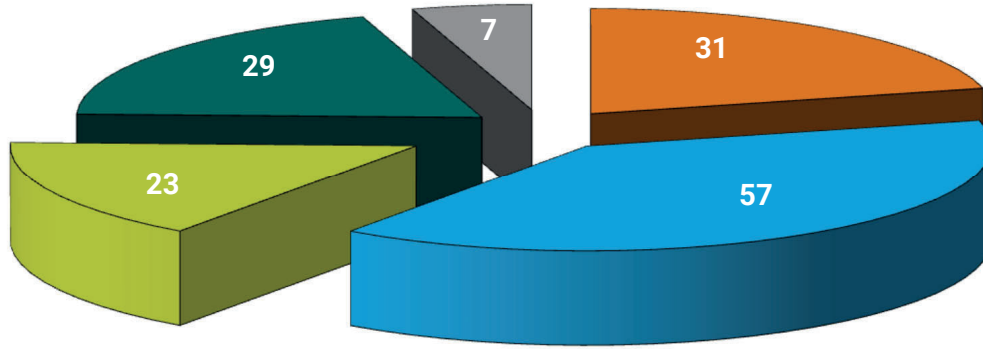
Dexter, J.: Assistant professorship at University of Colorado, Boulder, USA, August 2019

van Dishoeck, E.: Karl Schwarzschild Medal, Astronomische Gesellschaft, Stuttgart, Germany, September 2019

van Dishoeck, E.: Honorary Doctorate, University of Geneva, Geneva, Switzerland, October 2019

## Science Groups

### Staff Members by Science Group



■ Infrared    
 ■ HE-Astrophysics    
 ■ CAS    
 ■ OPINAS    
 ■ Research Groups

#### Infrared and Submillimeter Astronomy

Secretary: Richter, A.

Team Assistants: Dengler, S.; Kleiser, A.; Zanker-Smith, J.

Bauböck, Dr. M.; Belli, Dr. S. (until 31.08.); Coogan, Dr. R. (since 15.09.); Cortes, Dr. A.; Contursi, Dr. A. (until 28.02.); Dallilar, Dr. Y. (since 26.09.); Davies, Dr. R.; Dexter, Dr. J. (until 31.08.); Eisenhauer, Dr. F.; Feuchtgruber, Dipl.-Phys. H.; Förster Schreiber, Dr. N.; Gao, Dr. F.; Garrel, Dr. V. (until 07.12.); Gillessen, Dr. S.; Habibi, Dr. M.; Herrera-Camus, Dr. R. (until 31.03.); Hu, Dr. C.-Y. (since 02.10.); Lee, Dr. M.; Liu, Dr. Y. (until 24.12.); Lutz, Dr. D.; Meyer, M. (01.05.-31.07.); Ott, Dr. T.; Pfuhl, Dr. O. (until 31.07.); Poglitsch, Dr. A. (on leave); Price, Dr. S.; Rabien, Dr. S.; Rosensteiner, Dr. M. (until 31.12.); Schrubba, Dr. A.; Shanguan, Dr. J.; Shimizu, Dr. T.; Stadler, Dr. J. (since 01.11.); Sturm, Dr. E.; Tacconi, Dr. L.; Übler, Dr. H. (since 01.08.)

#### Guests

Netzer, Prof. H. (28.01.-12.02.); Lin, Dr. M. (11.02.-15.02.); Long, Dr. F. (09.03.-17.03.); Hu, Dr. C.-Y. (17.03.-22.03.); Zakamska, Prof. N. (08.04.-12.04.); Netzer, Prof. H. (16.07.-27.07.); Jameson, Dr. K. (16.-20.09.); Yu, S. (09.10.-18.10.); Contursi, Dr. A.; van Dishoeck, Prof. E.; Sternberg, Prof. A.; de Zeeuw, Prof. T.

#### PhD (D.) / Master (M.)

Cazzoletti, P. (until 30.11., D., van Dishoeck); Worth-Davies, R. (D., Tacconi/Förster-Schreiber/Genzel); Fellenberg von, S. (D., Eisenhauer/Gillessen); Jiménez Rosales, A. (D., Dexter/Genzel); Romagnolo, A. (seit 28.10., D., Eisenhauer/Gillessen); Übler, H. (until 31.07., D., Genzel); Waisberg, I. (until 31.07., D., Genzel); Widmann, F. (D., Eisenhauer), Wölfer, L. (D., van Dishoeck)

#### High-Energy Astrophysics

Secretary: Boller, B.

Team Assistants: Frankenhuizen, W.

Andritschke, Dr. R.; Becker, Dr. W.; Begue, Dr. D.; Behrens, Dr. A.; Beitler, C. (since 01.11.); Boller, Prof. Dr. Th.; Bolmer, J. (until 31.12.); Bonholzer, M.; Bradshaw, Dr. M.; Brunner, Dr. H.; Buchner, Dr. J. (since 01.03.); Bulbul, Dr. E. (since 01.09.); Burgess, Dr. M.J.; Burkert, Dr. W.; Buron, A.; Burwitz, Dr. V.; Carpano, Dr. S.; Chen, Dr. J. (until 30.11.); Dennerl, Dr. K.; Diehl, Dr. R. (until 28.02.); Eraerds, Dr. T.; Eder, Dipl.-Ing. J.; Emberger, V.; Erfanianfar, Dr. G. (until 31.10.); Freyberg, Dr. M.; Friedrich, Dr. P.; Friedrich, Dr. S. (since 01.09.); Fürmetz, Dr. M. (until 31.03.); Gaida, R.; Gatuzz, Dr. E. (since 01.02.); Ghirardini, Dr. V. (since 01.09.); Gueguen, Dr. A.; Greiner, Dr. J.; Grossberger, Dr. C. (until 31.10.); Gscheidle, C. (04.02.-30.09.); Haberl, Dr. F.; Hartmann, K.; Hartner, Dipl.-Math. G.; Haase, Dr. J. (since

01.03.); Hauser, G.; Hofmann, Dr. F. (until 30.06.); Keil, Dr. I. (since 01.08.); Kienlin von, Dr. A.; Klein, Dr. M.; Koch, A.; Liu, Dr. T.; Maitra, Dr. Ch.; Meidinger, Dr. N.; Merloni, Dr. A.; Ott, S.; Pellicciari, C.; Pfeffermann, Dipl.-Phys. E.; Predehl, Dr. P.; Ramos Ceja, Dr. M. (since 01.08.); Rau, Dr. A.; Reiffers, J.; Salvato, Dr. M.; Sanders, Dr. J.; Schweyer, T. (until 31.10.); Siegert, Dr. T. (until 31.03.); Stehlikova, V.; Stewart, Dr. I. (since 01.11.); Thi, Dr. W.-F.; Tran, J.; Treberspurg, Dr. W. (until 31.07.); Yazici, Dr. S.; Zhang, Dr. X.-L.

### Guests

Aird, Dr. J. (25.03.-28.03.); Baykal, Prof. Dr. A. (26.08.-01.09.); Baron, D. (05.07.-15.07.); Bräuninger, Dr. H.; Bulbul, Dr. E. (05.05.-17.05./30.06.-13.07.); Diehl, Dr. R. (since 01.03.); Erfanianfar, Dr. G. (since 01.11.); Gaspari, Dr. M. (08.01.-11.01.); Iyudin, Dr. A. (25.02.-22.03.); Kole, Dr. M. (13.05.-14.05.); Leung, Dr. S.-C. (25.05.-29.05.); Li, Dr. K.-L. (10.03.-13.03.); Mignani, Dr. R. (20.01.-26.01.); Ponti, Dr. G.; Rivera Sandoval, Dr. L. (12.02.-14.02.); Sala, Prof. Dr. G. (09.02.-15.02.); Simionescu, Dr. A. (03.02.-05.02.); Stewart, Dr. I. (02.09.-07.09.); Wang, Prof. Dr. W. (17.07.-20.08.); Weisskopf, Prof. Dr. M. (13.03.-16.03.)

### PhD (D.) / Master (M.)

Arcodia, R. (D., Merloni); Baronchelli, L. (D., Nandra); Beitler, C. (since 01.11., M., Meidinger); Berlato, F. (D., Greiner); Biltzinger, B. (M., Greiner); Bogensberger, D. (D., Nandra); Bolmer, J. (until 16.05., D., Greiner); Chitham, I. J. (D., Finoguenov); Coffey, D. (D., Salvato/Boller); Fresco, A. (D., Merloni); Kaefer, F. (D., Finoguenov); Malyali, A. (D., Rau); Mayer, M. (since 01.09., D., Becker); Müller-Seidlitz, J. (D., Becker/Meidinger); Pleintinger, M. (D., Diehl); Seppi, R. (since 01.10., D., Comparat); Steinmassl, S. (M., Greiner); Weinberger, C. (D., Diehl); Wolf, J. (since 01.04., D., Salvato)

### Optical and Interpretative Astronomy

Secretary: Ingram, C.

Bodendorf, Dr. C.; Böhringer, Prof. Dr. H.; Bohnet, Dipl. Phys. A.; Escartin, J. (since 01.10.); Fabricius, Dr. M.; Farrow, Dr. M.; Gajda, Dr. G.; Geis, Dr. N.; Gerhard, Prof. Dr. O.; Gracia Carpio, Dr. J.; Grupp, Dr. F.; Guglielmo, Dr. V. (since 01.08.); Haeuser, Dr. M. (since 01.05.); Hartung, I. (until 30.04.); Hopp, Dr. U.; Kaminski, J. (until 31.01.); Katterloher, Dr. R.; Khoperskov, Dr. S.; Mazzalay, Dr. X. (until 31.03.); Montesano, Dr. F. (until 30.04.); Obermeier, Dr. C. (until 31.10.); Paech, Dr. K. (since 01.01.); Parikh, Dr. T. (since 01.08.); Penka, M.Sc. D. (until 31.04.); Piemonte, A. (until 31.07.); Raison, Dr. F.; Saglia, PD. Dr. R.; Sanchez, Dr. A.; Snigula, Dr. J.; Steinwagner, Dr. J.; Wang, Dr. L. (until 31.03.); Thomas, Dr. J.; Wegg, Dr. C. (until 31.03.); Weller, Prof. Dr. J.; Wetzstein, Dr. M.

### Guests

Ruiz, Dr. A. (16.04.-31.07.); Paillas, Dr. E. (22.05.-22.08.); Correa, Dr. C. (04.06.-14.07.); Kormendy, Prof. J. (18.06.-17.12.); Kurban, Dr. F. (13.05.-08.08.); Crosta, M.Sc. M.

(11.06.-31.12.), Fall, Prof. M. (13.07.-13.08.); Drory, Dr. N. (01.07.-15.08.); Noyola, Dr. E. (01.07.-15.08.); Scullion, C. (01.07.-26.07.)

### PhD (D.) / Master (M.)

Arth, A. (D., Bender); Bolze, R. (M., Bender); Clarke, J. (D., Gerhard); DeNicola, S. (D., Saglia); Fahrenschoen, V. (D., Saglia); Finozzi, F. (D., Saglia); Häuser, M. (until 30.04., D., Bender); Hou, J. (D., Bender); Kellermann, H. (D., Grupp); Kluge, M. (D., Bender); Kodric, M. (D., Bender); Lippich, M. (D., Bender); Merghan, K. (D., Bender); Neureither B. (D., Thomas); Pulsoni, C. (D., Gerhard); Rehman, R. (D., Bender); Seminaite A. (D., Sanchez); Smolla, M. (D., Bender); Steuer, J. (D., Grupp); Varga, T. (D., Bender); Wylie, S. (D., Gerhard)

### Center for Astrochemical Studies

Secretary: Langer, A.

Bizzocchi, Dr. L.; Choudhury, Dr. R. (until 31.03.); de Oliveira Alves, Dr. F.; Endres, Dr. Ch.; Giuliano, Dr. B.M.; Gong, Dr. M.; Ivlev, Dr. A.; Jusko, Dr. P. (since 01.05.); Laas, Dr. J.; Lattanzi, Dr. V.; Mardones, D. (until 31.07.); Maureira Pinochet, Dr. M.J.; Mullins, Dr. A. (until 31.03.); Nagy, Dr. Z.; Nolan, Dr. Ch. (since 01.09.); Pineda Fornerod, Dr. J.; Schmiedeke Dr. A.; Segura-Cox, Dr. D.; Shingledecker, Dr. Ch.; Silsbee, Dr. K.; Sipilä, Dr. O.; Spezzano, Dr. S.; Szűcs, Dr. L.; Zampetaki, Dr. A. (since 01.03.); Zhao, Dr. B.

### Guests

Black, Prof. J. (02.12.-06.12.); Burkhardt, Dr. A. (26.10.-02.11.); Colzi, L. (01.02.-30.04.); Das, Dr. A. (10.03.-17.03.); Dogiel, Prof. Dr. V. (01.03.-30.04.); Fontani, Dr. F. (01.09.-15.11.); Fortov, Prof. V. (19.12.-22.12.); Fuente Juan, Dr. M. (28.01.-31.01.); Garrod, Dr. R. (16.01.-19.01.); Gavdush, Dr. A. (13.07.-24.07./16.10.-20.10.); Gerlich, Prof. D. (01.12.-06.12./01.02.-28.02.); Girart, Dr. J. (02.12.-06.12.); Grassi, Dr. T. (04.12.-06.12.); Hensley, Dr. B. (17.03.-23.03.); Inostroza, Dr. N. (25.01.-08.02.); Ioppollo, Dr. S. (02.12.-06.12.); Jusko, Dr. P. (25.03.-29.03.); Kirill, Dr. Z. (16.10.-20.10.); Majumda, Dr. L. (05.05.-12.05.); McGuire, Dr. B. (02.12.-06.12.); Pietropoli Charmet, Dr. A. (11.02.-15.02./08.04.-12.04.); Punanova, Dr. A. (09.03.-23.03.); Rivilla, Dr. V. (02.02.-23.03.); Shirley, Dr. Y. (08.09.-15.09.); Tafalla, Prof. M. (04.12.-07.12.); Tan, Prof. J. (24.01.-27.01./28.02.-03.03./11.07.-15.07./11.10.-16.10./04.12.-07.12.); Vasyunin, Dr. A. (09.03.-23.03.); Yang, Y. (03.02.-09.02.)

### PhD (D.) / Master (M.)

Agurto Gangas, C. (D., Caselli); Alberton, D. (15.05.-06.09., M., Bizzocchi); Chantzios, J. (D., Spezzano); Choudhury, S. (D., Caselli); Müller, B. (D., Caselli); Prudenzeno D. (D., Caselli); Redaelli, E. (D., Caselli); Tonollo, F. (17.02.-16.05., M., Bizzocchi); Winkler M. (since 01.01., D., Caselli); Zamponi Fuentealba, J. (since 01.09., D., Caselli)

**Research Group Burkert**

Burkert, Prof. Dr. A.; Behrendt, Dr. M.; Blana, Dr. M.; Scharmann, Dr. M.

***PhD (D.) / Master (M.)***

Heigl, S. (until 14.02., D., Burkert)

**Research Group Mohr**

Klein, Dr. M. (until 30.06.); Mohr, Prof. Dr. J.

***PhD (D.) / Master (M.)***

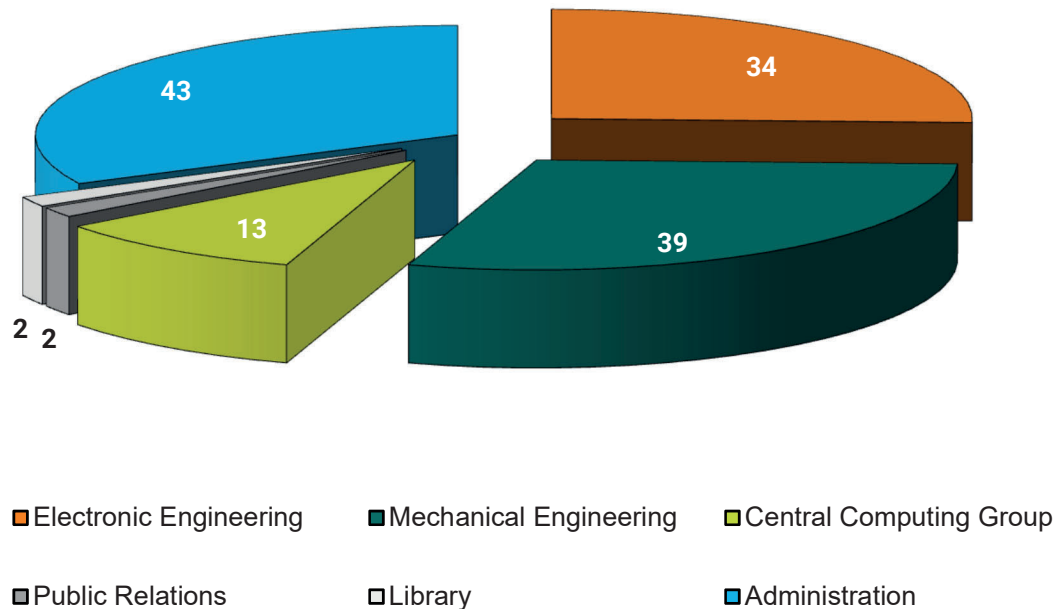
Grandis, S. (D., Mohr); Paulus, M. (D., Mohr)

**Research Group Müller**

Ali-Lagoa, Dr. V. (until 31.03.); Müller, Dr. Th.

## Engineering and Workshop

### Engineering, Workshops and Central Services Staff



#### Electrical Engineering

Plattner, Dr. M. (Head of Electronics)

Albrecht, Dipl.-Ing. S.; Barl, Dipl.-Ing. (FH) L.; Besendörfer, A.; Böhme, H.; Bornemann, Dipl.-Ing. (FH) W.; Burghardt, Dipl.-Ing. (FH) T.; Buron, M.Sc. A.; Grabichler, M.Sc. J.; Hälker, Dipl.-Ing. (FH) O.; Hans, O.; Hartmann, K.; Kink, Dipl.-Ing. (FH) W.; Köglmeier, B.; Lederhuber, M.Sc. A.; Mandla, M.Sc. C.; Müller, Dipl.-Ing. (FH) S.; Ott, Dr.-Ing. S.; Rau, M.Sc. C.; Reiffers, Dipl.-Ing. (FH) J.; Schrey, F.; Schulte, Dr. W.; Yaroshenko, V.; Zanker-Smith, J.; Ziegler, Dipl.-Ing. (FH) J.

#### Electrical Workshop and Utilities Management

Oberauer, F. (Head)

Bachhuber, M.; Berger A. (since 01.04.); Cibooglu, H.; Emslander, A.; Greßmann, R.; Langer, P.; Özdemir, H.; Rupprecht, T.; Schneider, M.

#### PhD (D.) / Master (M.)

Skvarc Bozic G. (until 30.09., M., Ott); Hudomalj U. (until 30.09., M., Mandla); Alves Laranjera Neri M. (until 30.09., M., Plattner); Guggemos M. (until 31.11., M., Tran); Papist H. (since 15.06., M., Tran); Neumeier L. (M., Plattner)

#### Mechanical Engineering and Test Facilities

Schubert, Dr. J. (Head of Mechanics)

Antonelli, Dr.-Ing. V. (since 01.12.); Deysenroth, C.; Deysenroth, M.; Dittrich, Dipl.-Ing. (FH), K.; Emslander, A.; Eng, B. (since 01.07.); Geis, Dr., N.; Gemperlein, Dipl.-Phys., H.; Hartl, Dr., M.; Haußmann, F.; Hörmann, M.Sc., V.; Huber, Dipl.-Ing. H.; Mican, Dipl.-Ing., B.; Paßlack, Dipl.-Ing. (FH), S.; Pflüger, Dipl.-Ing. (FH), A.; Pietschner, Dipl.-Ing. (FH), D.; Rohe, C.; Strecker, R.; Tran, M.Sc., J.

#### Mechanical Workshop

Czempiel, S. (Head)

Bayer, R.; Brara, A.; Budau, B.; Cziasto, D. (01.04.-31.07.); Eibl, J.; Feldmeier, P.; Fischer, C. (07.01.- 30.06.); Furchtsam, C. (since 01.08.); Goldbrunner, A.; Hartwig, J.; Honsberg, M.; Huber, D.; Huber, F.-X.; Kestler, H.-J.; Knapp, S.; Krautz, C. (since 01.01.); Reinold, A.; Sandmair, R.; Schunn, W.; Schuppe, D.; Soller, F.; Zieglmeier, J. (since 01.02.)

#### Apprentices

Bergner, K.; Furchtsam, C. (until 31.07.); Furchtsam, S. (since 01.09.); Heckmair, S.; Loichinger, L.; Stadler, B. (since 01.09.); Waldhör, F.; Zieglmeier, J. (until 31.01.)

## Student Assistants and Interns

### ***Student Assistants***

Neumeier, L.; Alexander, B.; González, J.; Hameed, M. S.; Erhart, M.; Spagnolli, M.; Wendebourg, Y.; George, P.; Korth, T.; Sousa Barros, A. F.; Schoch, S.; Mahmoud, H.; Kulan, A.; Reyes Mantilla, C.; Hu K.

### ***Work Experience (Refugees)***

Abdoulkader, E.; Ahmad, D.; Akbari, A.R.; Alaeed, M.; Amiri, H.; Berisha, Y.; Berr, L.; Boru, A.; Dalo, L.; Decker, F.; Dmitrouleas, S.; Filip, B.; Hailemariam, I.; Lenz, M.; Mladenovic, N.; Mohammadi, A.; Mohammadi, E.; Muradi, M.; Najibullah, A.; Noori, Z.; Oba, E.O.F.; Rubaie, O.; Shahidulla, D.; Vetter, M.

### ***Work Experience (High School)***

Albrecht, M.; Amorim, D.; Böhm, F.; Eigenwillig, L.; Gentken, N.; Ivaldi, A.; Ivaldi, M.; Kratschmann, J.; Mändle, J.; Melissas, K.; Rentz, M.; Rommel, E.; Rossbach, A.K.; Runge, X.; Schmidt, L.-M.

### ***Work Experience (University)***

Alberton, D.; Barros, P.; Kiener, F.; Lederle, L.



## Central Services

### Computing

#### Central Computing Committee

Haberl, Dr. F. (Chair)

Bohnet, Dipl.-Phys. A.; Endres, Dr. C.; Fabricius, Dr. M.; von Kienlin, Dr. A.; Müller, Dipl.-Ing. (FH) S.; Ott, Dr. T.; Schubert, Dr. J.

#### Central Computing Support Group

Bohnet, Dipl. Phys. A. (Head)

Agudo Berbel, A.; Baumgartner, H.; Kleiser, A.; Klose, L.; Kollmer, C.; Oberauer, A.; Ott, Dr. T.; Paul, J.; Elsner, C. (since 01.04.); Snigula, Dr. J.; Wieprecht, Dipl.-Ing. E.; Wiezorrek, Dipl.-Ing. (FH) E.

### Public Relations

Hämmerle, Dr. H.; (Head)

Collmar, E.; Niebisch, B.

### Library

Bartels, C. (Head)

Blank, E., Bolicivic, M. (since 15.02.)

### Administration

Wanger, H. (Head VAD)

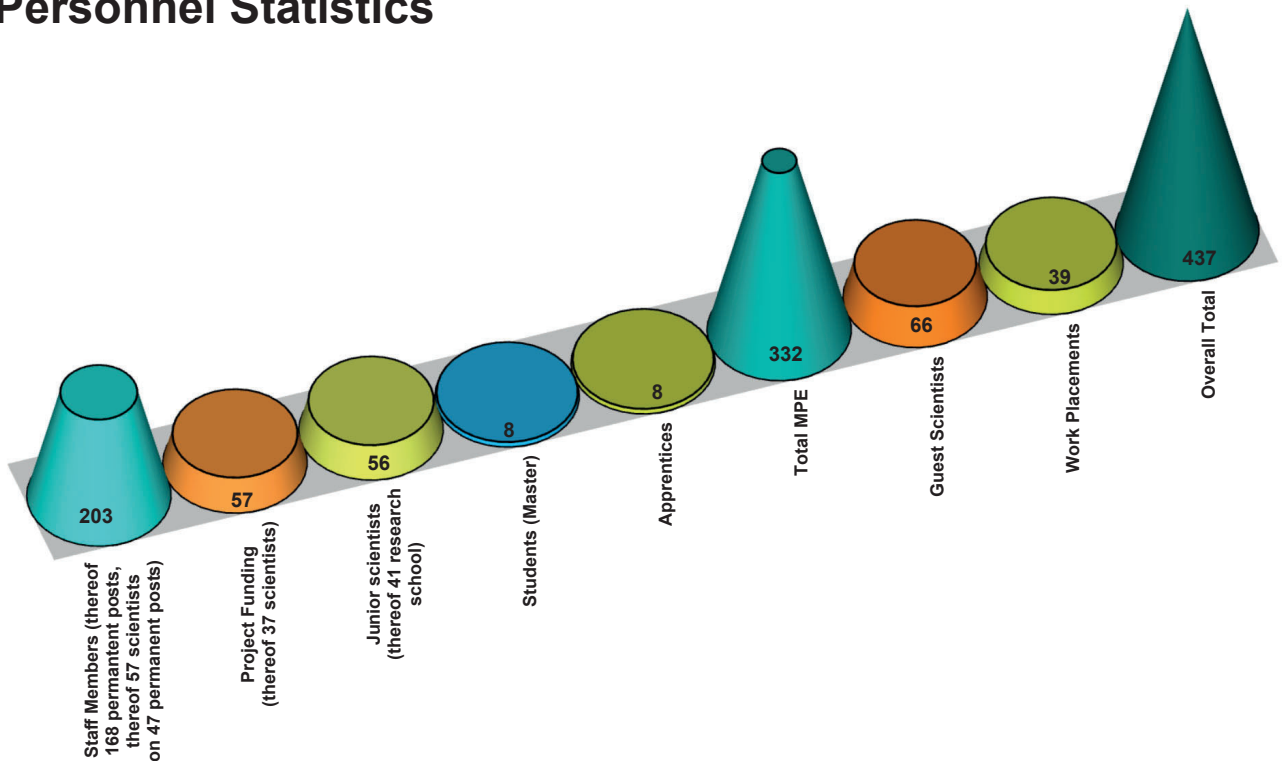
Secretary: Hesselner, G.

Apold, G.; Arturo, A.; Ayari, S.; Bauer, T.; Belscak, L.; Cziasto, U.; Eder, A. (since 01.09.); Eicher, C.; Gareva, L.; Goldbrunner, S.; Grohmann, M.; Hartung, I.; Hausmann, S.; Hidas, R.; Hofstetter, S.; Jäkel, T.; Jirsch, Y.; Kaps, S.; Keil, M.; Kestler, L.; Krapivina, A.; Kuhwald, E.; Maier, E.; Nagy, A.; Neun, A. (BR); Paschou, J.; Preisler, C.; Rochner, R.; Rosenberger, S.; Sacher, A.; Sandtner, P. (until 31.12.); Studier, S. (since 01.10.); Schmidt, A.; Schwaiger, S.; Seyfarth, B.; Stock, C.; Stöckl, D.; Stricker, C.; Thies, F.; Thies, L.; Üblacker, K.; Vogt, J.P.

### IMPRS

Hilbert, A.

## Personnel Statistics



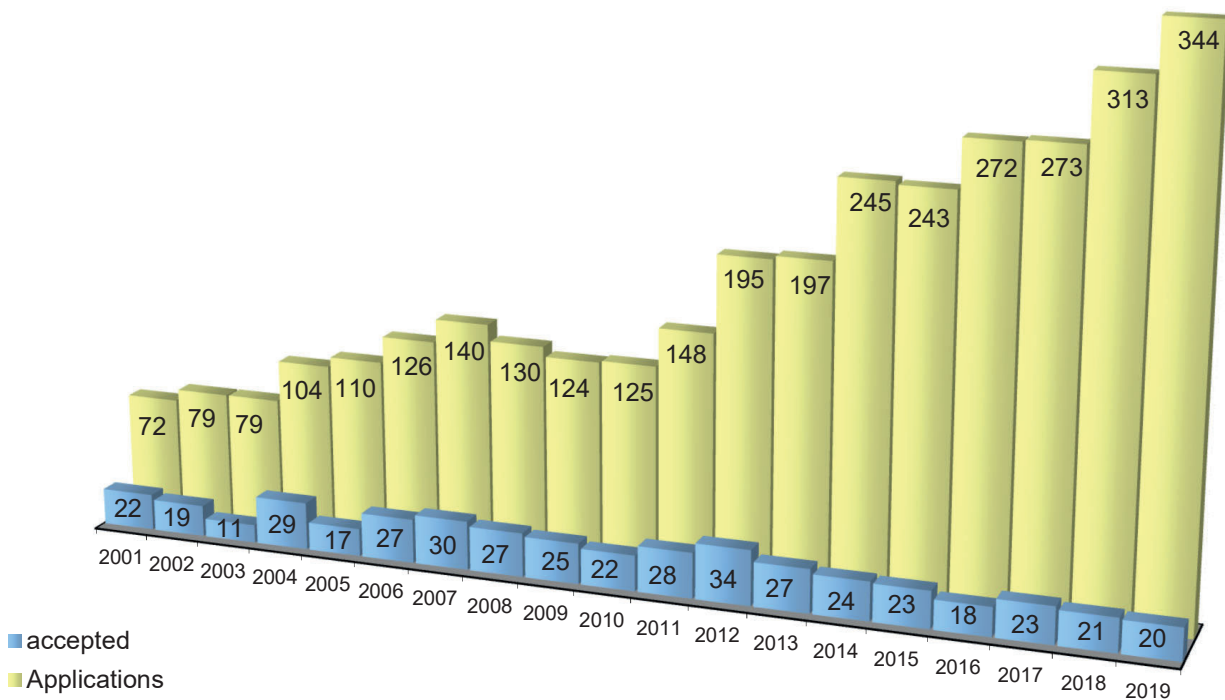
## International Max-Planck Research School (IMPRS) for Astrophysics

The IMPRS for Astrophysics is a graduate school at the Ludwig Maximilians University (LMU) Munich. The school is a joint project of the Max Planck Institutes MPE and MPA (Max-Planck Institute for Astrophysics) as well as the Observatory of the LMU Munich and the European Southern Observatory ESO. In the academic year 2019 a total of 95 students took part in the program, thereof 46

at the MPE. 344 students from 55 countries applied for the year 2019. 20 students were accepted, thereof 8 at the MPE.

As a rule, several PhD students from local universities join the program during the year, so that on average 24 PhD students take part per year.

### IMPRS Applications since 2001



Summary of annual applications for the IMPRS Programm in Garching. Since its start in 2001, a total of 3319 students applied until 2019, 447 were accepted.

### Public Relations Work

In 2019, the MPE engaged in following PR activities: 43 public talks by MPE scientists, 11 press releases on scientific results, 5 general news (scientific prizes, awards), 18 guided tours through the institute (mainly scientific-ly oriented school classes). 15 high school students (1 - 2 weeks) and 4 university students (4 - 8 weeks) were supervised during their internship at the MPE. 24 persons took part in the internship for refugees (1-3 weeks).

With our "MPE for Women in Science" initiative we organised a public evening lecture by a female astrophysicist for the "International Day for Women and Girls in Science" in February.

45 girls were introduced to the MPE and its science via the federal initiative "Girls' Day" in March. More information about the PR work at the MPE can be found at:

<http://www.mpe.mpg.de>

# Project-Groups

(Project Manager underlined)

## Infrared and Submillimeter Astronomy

Deputy to the Director of the Group:  
Lutz, Tacconi.

### ERIS

Buron, Cortes, Dallilar, Ric Davies, M. Deysenroth, Eisenhauer, Feuchtgruber, Gemperlein, Hans, Hartl, H. Huber, Kleiser, Mandla, Plattner, C. Rau, Schubert, Sturm, Wiezorrek.

### GRAVITY

Buron, Eisenhauer, Gao, Genzel, Gillessen, Haußmann, T. Ott, Pfuhl, Shangguan, Stadler, Straub, Sturm, Waisberg, Widmann, Wieprecht, Wiezorrek, Zanker-Smith.

### LBT Argos

Barl, Ric Davies, M. Deysenroth, Gemperlein, Rabien, Rosensteiner, Zanker-Smith, Ziegleder.

### MICADO

Barl, Ric Davies, Dengler, B. Eder, J. Eder, Garrel, Gemperlein, Hartl, Hörmann, H. Huber, Kleiser, Mandla, Manhart, Plattner, Rabien, Rosensteiner, Schubert, Sturm, Ziegleder.

### Galactic Center

Bauböck, Dexter, Eisenhauer, Genzel, Gillessen, Habibi, T. Ott, Pfuhl, von Fellenberg, Stadler, Straub, Waisberg, Widmann.

### Galactic Nuclei

Contursi, Ric Davies, Dexter, Genzel, Herrera-Camus, Lutz, Schrubba, Shangguan, Shimizu, Sturm, Tacconi, de Zeeuw.

### Galaxies at High Redshift

Belli, Coogan, Rebecca Davies, Förster Schreiber, Genzel, Habibi, Herrera-Camus, Lee, Lutz, Price, Sturm, Tacconi, Übler.

### Star Formation

Cazzoletti, Hu, Liu, Schrubba, van Dishoeck, Wölfer.

### Theory

Dexter, Bauböck, Jimenes Rosales, Waisberg.

## High-Energy Astrophysics

### ATHENA/Mirror:

Bradshaw, Budau, Burwitz, Hartner, Passlack.

### ATHENA/WFI:

Albrecht, Andritschke, Antonelli, Behrens, Beitler, Bonholzer, Bornemann, Eder, Emberger, Eraerds, Freyberg, Fürmetz, Gscheidle, Haberl, Hälker, Hartmann, Hauser, Kink, Lederhuber, Mican, Meidinger, Nandra, S. Ott, Pietschner, Plattner, A. Rau, Schubert, S. Müller, Müller-Seidlitz, Reiffers, Schoch, Strecker, Tran, Treberspurg, v. Kienlin.

### Chandra

Burwitz, Predehl.

### Einstein Probe/Detector:

Keil, Meidinger, Nandra.

### Einstein Probe/Mirror:

Burwitz, Eder, Friedrich, Gaida, Hartmann, Rohe, Schuppe.

### eROSITA

Andritschke, Becker, Boller, Bornemann, Bräuninger, Brunner, Budau, Burghardt, Bulbul, Burwitz, Carpano, Coutinho, Dennerl, Dittrich, Eder, Eibl, Emberger, Eraerds, Freyberg, P. Friedrich, S. Friedrich, Gaida, Goldbrunner, Gueguen, Grossberger, Haberl, Hälker, Hartmann, Hartner, F. Huber, v. Kienlin, Kink, Maitra, Meidinger, Merloni, Mican, S. Müller, Nandra, F. Oberauer, Pfeiffermann, Pietschner, Predehl, Ramos-Ceja, Rau, Reiffers, Rohé, Rupprecht, Salvato, Sanders, Schrey, Schuppe, Soller, Stewart, Trümper, Yaroshenko.

### ROSAT

Boller, Freyberg, Haberl, Trümper.

### Swift

Greiner.

### XMM-Newton

Boller, Dennerl, Freyberg, Haberl, Meidinger, Trümper.

### Fermi

Collmar, Diehl, Greiner, v. Kienlin.

### GROND

Chen, A. Rau, Schrey, Schweyer.

### INTEGRAL

Diehl, Siegert, v. Kienlin, X.-L. Zhang.

### MXT-SVOM

Bradshaw, Burwitz, Meidinger, Nandra, A. Rau.

### eXTP

Meidinger, Nandra, Yazici.

### 4MOST

Boller, Comparat, Merloni, Salvato, Thi.

### Active Galaxies

Boller, Buchner, Collmar, Comparat, Liu, Merloni, Nandra, Salvato.

### Clusters of Galaxies

Bulbul, Comparat, Gatuzz, Ghiradini, Ramos-Ceja, Sanders.

### eBOSS/SPIDERS

Comparat, Merloni, Nandra, Salvato.

## Optical and Interpretative Astronomy

### Large Scale Structure, eBoss, HETDEX

Bender, Farrow, Fabricius, Hopp, Sanchez.

### EUCLID

Bender, Escartin, Fabricius, Garcia Carpio, Gillhuber, Grupp, Guglielmo, Hartung, Kaminski, Penka, Raison, Saglia, Steinwagner, Wetzstein.

### KMOS

Beifiori, Bender, Saglia, Wilman.

### MICADO

Bender, Fabricius, Saglia, Thomas.

### PanSTARRS

Bender, Farrow, Hopp, Saglia.

### Galaxy Dynamics

Bender, Dehnen, Gajda, Gerhard, Khoperskov, Mazzalay, Parikh, Saglia, Thomas.

### Prime Focus Spectrograph

Bender, Fabricius, Garcia Carpio, Sanchez.

### Stellar Populations and Galaxy Formation

Bender, Hopp, Parikh, Saglia.

## Center for Astrochemical Studies

### Observations

De Oliveira Alves, Maureira Pinochet, Nagy, Pineda Fornerod, Schmiedeke, Segura-Cox

### Theory

Gong, Ivlev, Pavol, Mullins, Nolan, Shingledecker, Silsbee, Sipilä, Szűcs, Zhao

### Laboratory

Bizzocchi, Endres, Giuliano, Laas, Lattanzi, Spezzano.

# Teaching

## IMPRS on Astrophysics, Garching

### Becker

Doktorandenseminar über aktuelle Themen aus der Astrophysik (WS 19/20)

### Merloni

Astrophysical Black Holes (SS 19)

## LMU München

### Becker

Gravitationswellen und deren Nachweis (WS 19/20)

### Bender

Astronomisches Kolloquium (SS 19, WS 19/20)

Astrophysikalisches Grundpraktikum (SS 19, WS 19/20)

Forschungsprojekt Masterarbeit, Anleitung zum wissenschaftlichen Arbeiten (SS 19, WS 19/20)

Astrophysikalisches Hauptseminar theoretisch und numerisch orientiert, "Tools in modern astrophysics" (SS19, WS 19/20)

Begleitendes Kolloquium zum Astrophysikalisches Hauptseminar theoretisch und numerisch orientiert (SS19, WS 19/20)

Astrophysikalisches Hauptseminar experimentell und beobachtungsorientiert, "Tools in modern astrophysics" (SS 19, WS 19/20)

Begleitendes Kolloquium zum Astrophysikalisches Hauptseminar experimentell und beobachtungsorientiert (SS 19, WS 19/20)

Projektseminar mit begleitendem Kolloquium "Extragalactic group seminar" (SS 19, WS 19/20)

Projektseminar mit begleitendem Kolloquium "Gravitational Lensing" (SS19, WS 19/20)

Projektseminar mit begleitenden Kolloquium "Galaxies" (SS 19, WS 19/20)

Projektseminar mit begleitenden Kolloquium aus dem Bereich experimenteller Arbeiten und Instrumentenentwicklung in der Astronomie (SS 19, WS 19/20)

Projektseminar mit begleitendem Kolloquium, vorbereitendes Kolloquium zur Masterarbeit mit Tutorium, Kolloquium und Tutorium aus dem Bereich der Kosmologie, Anleitung zum wissenschaftlichen Arbeiten (SS 19, WS 19/20)

Projektseminar mit begleitenden Kolloquium, vorbereitendes Kolloquium zur Masterarbeit mit Tutorium, Kolloquium und Tutorium aus dem Bereich experimenteller Arbeiten, Anleitung zum Wissenschaftlichen Arbeiten (SS 19, WS 19/20)

### Ivlev

Plasma physics for astrophysics (WS 18/19)

### Mohr

Projektseminar mit begleitendem Kolloquium "Cosmology and Structure Formation group seminar" (SS 19, WS 19/20)

Projektseminar mit begleitendem Kolloquium "Software Entwicklung für Astronomie" (SS 19, WS 19/20)

### Weller

Grundlagen der fortgeschrittenen Astrophysik (SS 19)

Ergänzung zur Vorlesung "Grundlagen der fortgeschrittenen Astrophysik" (SS 19)

Wissenschaftskommunikation - Kompliziertes einfach erzählt/erklärt (WS 18/19, WS 19/20)

Cosmology and Large-Scale Structure (WS 19/20)

## Technische Universität München

### Eisenhauer

Einführung in die Astrophysik ( WS 18/19, WS 19/20)

High Angular Resolution Astronomy (SS 19)

## Astrochemical Origins Winter School (Perugia/Italy)

### Caselli

Star Formation (WS 19)

Planet Formation (WS 19)

## Goethe-Universität Frankfurt

### Boller

Radiation and Matter (SS 19)

Astronomical Coordinate Systems (SS 19)

AGN Physics (WS 19/20)

## Universität Amsterdam

### Dexter

Summer school tutorials in theoretical astrophysics: black hole accretion and radiative transfer (SS 19)

## Dt. Museum/Kerschensteiner Kolleg

### Müller

Astronomie und Kosmologie (SS 19)

Die dunkle Seite des Sonnensystems (SS 19)

## Organisation of Scientific Seminars / Conferences

Thermal Models for Planetary Science III, Hungarian Academy of Sciences, Budapest, Hungary, 20.02.-22.02., Organisation: T.G. Müller (Chair), C. Kiss.

Sind wir allein? Evangelische Akademie Tutzing, Tutzing, Germany, 08.03.-10.03., Organisation: U. Haerendel, G. Haerendel.

Small Bodies Near and Far, AMU/Poznań, Poland, 07.05.-09.05., Organisation: T.G. Müller, A. Marciniak.

Feedback and its Role in Galaxy Formation, Spetses, Greece, 25.06.-29.06., Organisation: A. Cattaneo, A. Dekel, S. Faber, N. M. Förster Schreiber, M. Krumholz, A. Macció, C. Martin, J. Silk.

MIAPP Topical Workshop: Nine Billion Years of Neutral Gas Evolution, Garching, Germany, 29.07.-31.07., Organisation: M. Aravena, A. J. Baker (Chair), A. Burkert, R. Davé, S. Ellison, J. van Gorkom, N. Kanekar, P. Moller, R. Morganti, C. Peroux, E. Sadler, A. Saintonge, L. Staveley-Smith, L. Tacconi, M. Verheijen, and M. Zwaan.

Views on the Interstellar Medium in Galaxies in the ALMA Era, Bologna, Italy, 02.09.-06.09., Organisation: F. Pozzi (co-chair), R. Decarli (co-chair), A. Bolatto, A. Cimatti, F. Combes, C. Gruppioni, R. Maiolino, M. Ouchi, G. Popping, J. Silverman, L. J. Tacconi, M. Talia, and L. Vallini.

Extremely Big Eyes on the Early Universe, Rome, Italy, 09.09.-13.09., Organisation: A. Fontana (co-chair), L. Pentericci (co-chair), A. Renzini, M. Tavani, M. Cirasuolo, L. Tacconi, E. Stanway, R. Pello, D. Elbaz, J. Gallego, P. Oesch, G. Ostlin and S. Blyth.

KIAA Forum on Gas in Galaxies: Multiple-Phase ISM, Beijing, China, 09.09.-13.09., Organisation: R. Wang (co-chair), J. Wang (co-chair), K. Wang (co-chair), R. Decarli (co-chair), Y. Peng (co-chair), A. Burkert, A. Omont, D. Keres, E. Daddi, E. P. Farina, G. Lanzuisi, L. Kewley, L. J. Tacconi, L. Cortese, and Q. Zhang.

Cosmic Turbulenced and Magnetic Fields: Physics of Baryonic Matter across Time and Scales, Cargese, France, 04.11- 08.11., Organisation: F. Boulanger (co-chair), B. Elmegreen, E. Falgarone (co-chair), R. Klessen, F. Levrier, J.-L. Puget, L. J. Tacconi, and R. Teyssier.

## Publications

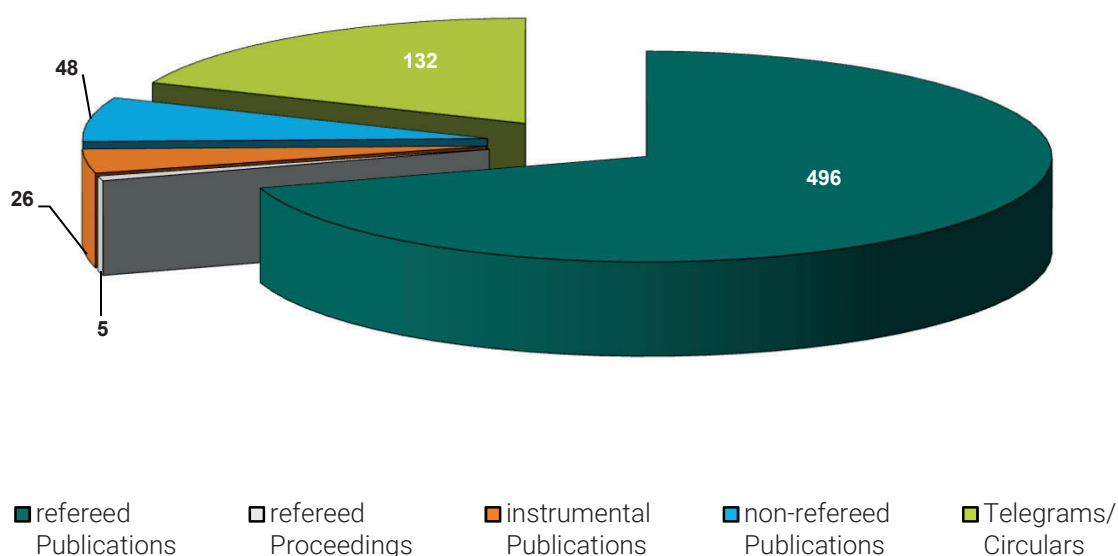
Here we present a tabular and graphical summary of our publication activities in 2019. The publications are counted by science group and publications type. The individual publications are listed consecutively.

### Summary of MPE Publications in 2019

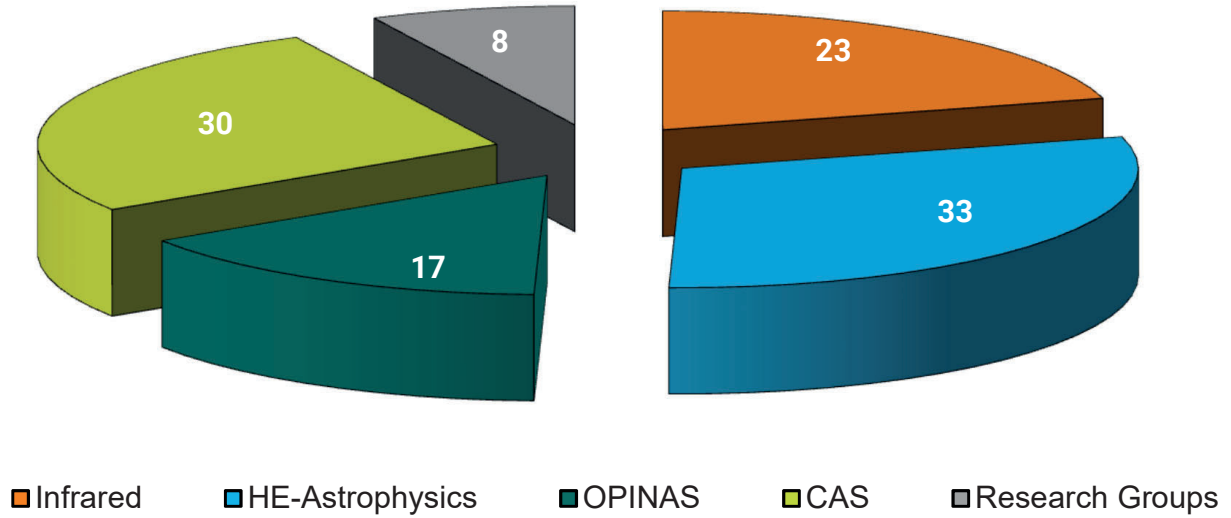
Science Groups	Refereed Publications	Refereed Proceedings	Instrument. Publications	Non-refereed Publications	Telegrams/Circulars	Talks	Poster
IR	23 (129)	1 (1)	0 (4)	9 (23)	4 ( 17)	118 (164)	3
HE Astrophysics	33 (150)	1 (1)	9 (18)	5 (11)	46 (100)	53 ( 97)	5
OPINAS	17 (100)	0 (2)	3 (4)	3 ( 8)	0 ( 3)	30 ( 40)	2
CAS	30 ( 83)	1 (1)	0 (0)	0 ( 1)	6 ( 10)	30 ( 48)	11
Res. Grp	8 ( 34)	0 (0)	0 (0)	1 ( 5)	1 ( 2)	3 ( 15)	4
<b>Total</b>	<b>111 (496)</b>	<b>3 (5)</b>	<b>12 (26)</b>	<b>18 (48)</b>	<b>57 (132)</b>	<b>234(364)</b>	<b>25</b>

The black entries give the number of publications with a first author from the MPE or invited talk, respectively. The red entries in brackets show the total number of publications with MPE contributions or talks (including the black numbers). Publications with contributions from more than one research group are counted for the group of the leading author. Posters are counted only if the first author is a MPE member.

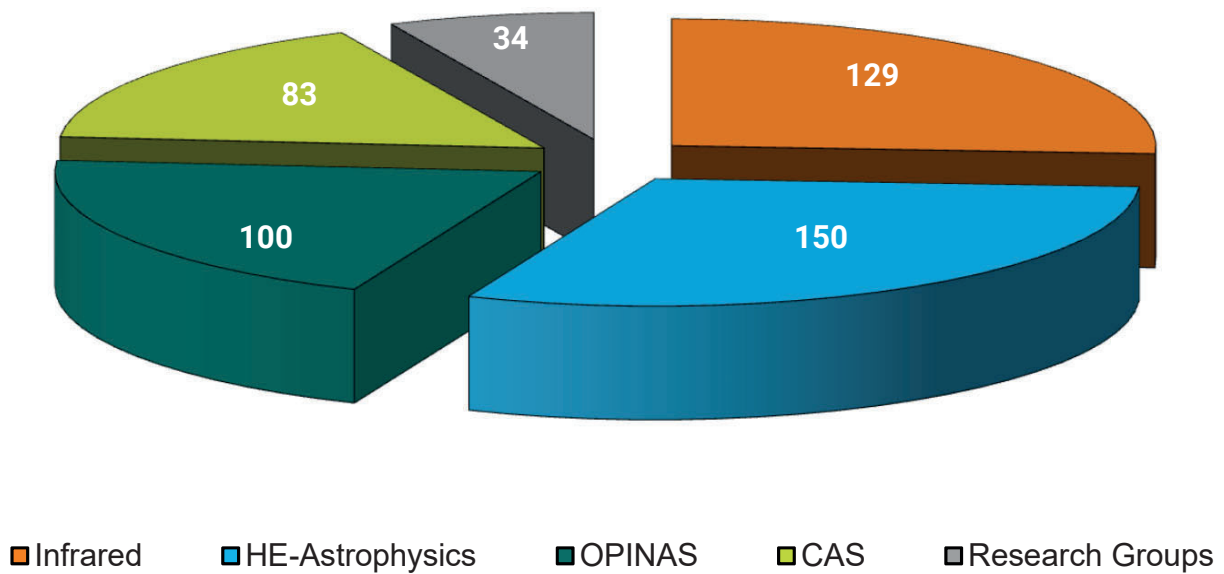
### MPE Publications 2019 (by Type)



### Refereed Publications with MPE first author in 2019 (by Science Group)

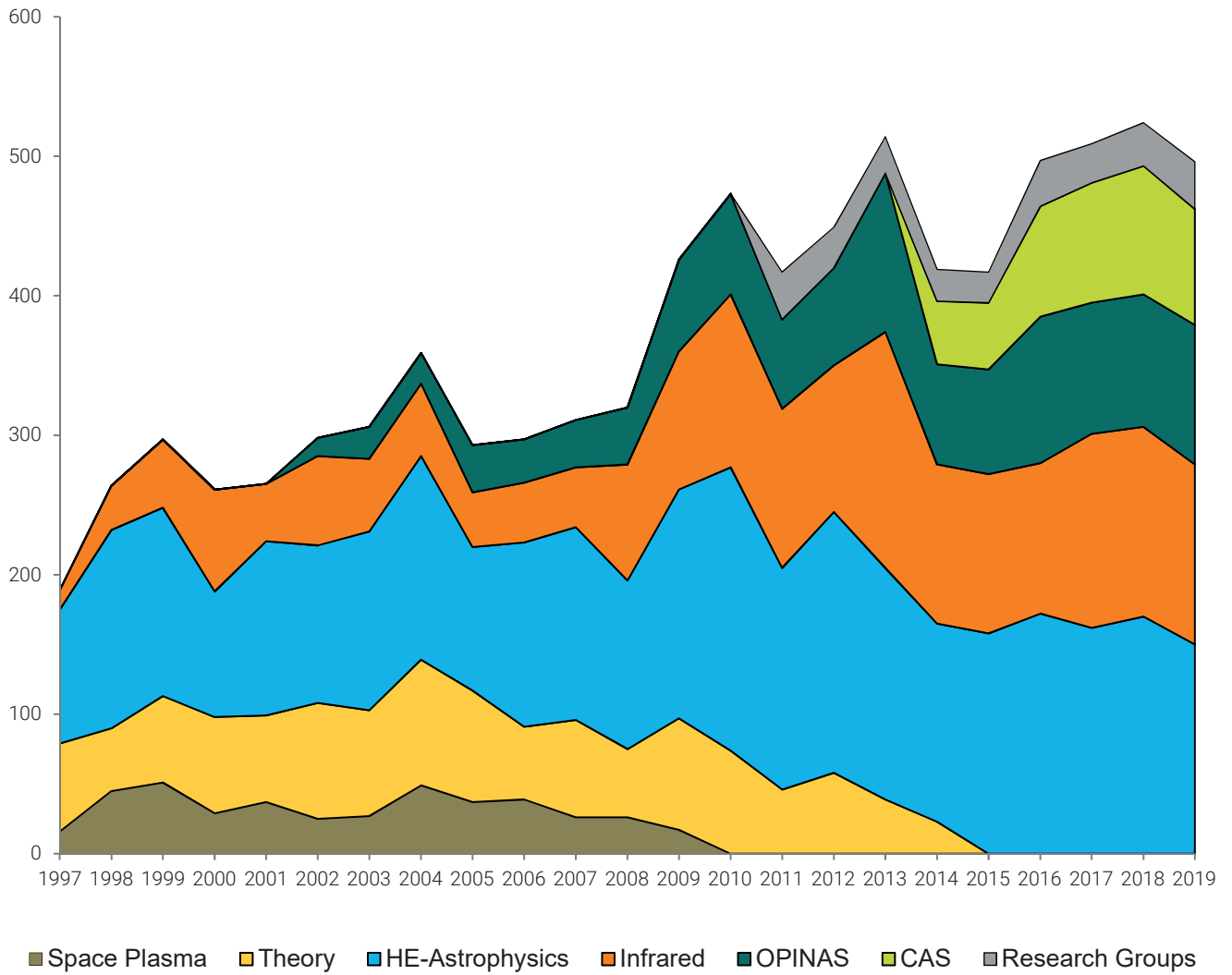


### Total refereed MPE Publications in 2019 (by Science Group)





## History of MPE Total Refereed Publications (by Science Group)



## Refereed Publications

- Abbott, T.M.C., A. Alarcon, S. Allam, ..., B. Hoyle, ..., J.J. Mohr, ..., J. Weller, ..., and DES Collaboration: Cosmological Constraints from Multiple Probes in the Dark Energy Survey. *Physical Review Letters* 122, 171301 (2019).
- Abbott, T.M.C., F.B. Abdalla, A. Alarcon, ..., J.J. Mohr, ..., J. Weller, R. Williamson, W.L.K. Wu, B. Yanny, O. Zahn, Y. Zhang, J. Zuntz, et al.: Dark Energy Survey year 1 results: Joint analysis of galaxy clustering, galaxy lensing, and CMB lensing two-point functions. *Physical Review D* 100, 023541 (2019).
- Abbott, T.M.C., F.B. Abdalla, A. Alarcon, ..., B. Hoyle, ..., J.J. Mohr, ..., J. Weller, et al.: Dark Energy Survey Year 1 Results: Measurement of the Baryon Acoustic Oscillation scale in the distribution of galaxies to redshift 1. *Mon. Not. R. Astron. Soc.* 483, 4866-4883 (2019).
- Abbott, T.M.C., F.B. Abdalla, S. Avila, M. Banerji, ..., B. Hoyle, J.J. Mohr, ..., J. Weller, et al.: Dark Energy Survey year 1 results: Constraints on extended cosmological models from galaxy clustering and weak lensing. *Physical Review D* 99, 123505 (2019).
- Abbott, T.M.C., S. Allam, P. Andersen, ..., B. Hoyle, ..., J.J. Mohr, et al.: First Cosmology Results using Type Ia Supernovae from the Dark Energy Survey: Constraints on Cosmological Parameters. *Ap. J. Lett.* 872, L30 (2019).
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- Alonso-Herrero, A., S. García-Burillo, M. Pereira-Santaella, R.I. Davies, F. Combes, M. Vestergaard, S.I. Raimundo, A. Bunker, T. Díaz-Santos, P. Gandhi, I. García-Bernete, E.K.S. Hicks, S.F. Hönl, L.K. Hunt, M. Imanishi, T. Izumi, N.A. Levenson, W. Maciejewski, C. Packham, C. Ramos Almeida, C. Ricci, D. Rigopoulou, P.F. Roche, D. Rosario, M. Schartmann, A. Usero and M.J. Ward: Nuclear molecular outflow in the Seyfert galaxy NGC 3227. *Astron. Astrophys.* 628, A65 (2019).
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- Obermeier, C.: Surveying exoplanets across the spectrum - following the TraCS of exoplanets, Extreme Solar Systems IV conference, Reykjavik, Iceland, August 2019.
- Rau, A.: The Science of the Athena Wide Field Imager, X-ray Astronomy 2019 - Current Challenges and New Frontiers in the Next Decade, Bologna, Italy, September 2019.
- Redaelli, E. et al.: Deuteration of  $\text{N}_2\text{H}^+$  and  $\text{HCO}^+$  in the pre-stellar core L1544, Astrochemistry: From nanometers to megaparsecs - A symposium in honour of John H. Black, Gothenburg, Sweden, June 2019.
- Rosensteiner, M. et al.: The MICADO/MAORY PSF reconstruction service, AO4ELT6, Quebec City, Canada, June 2019.
- Shingledecker, C.N. et al.: Radiation Chemistry in Astrochemical Models: From the Lab to the ISM, IAU Symposium 350, Cambridge, UK, April 2019.
- Spezzano, S. et al.: The distribution of methanol around starless cores, Crete III: Through dark lanes to new stars, Crete, Greece, September 2019.
- Winkler, M. et al.: Probing RNA-stability, formation and catalysis in simulated prebiotic environments on the early Earth and in Space, Annual meeting of the Deutsche Astrobiologische Gesellschaft, Vienna, Austria, September 2019.
- Winkler, M. et al.: Probing RNA-stability, formation and catalysis in simulated prebiotic environments on the early Earth and in Space, Laboratory Astrophysics Workshop "The chemical evolution of cosmic matter, Bad Honnef, Germany, October 2019.
- Wolf, J. et al.: Exploring the Diversity of Type 1 Active Galactic Nuclei Identified in SDSS-IV/SPIDERS, X-RAY ASTRONOMY 2019, Bologna, Italy, September 2019.
- Wölfer, L. et al.: Radiation-Hydrodynamical Models of X-ray Photoevaporation in Carbon Depleted Circumstellar Discs, From Stars to Planets II, Gothenburg, Sweden, June 2019.
- Wölfer, L. et al.: Radiation-Hydrodynamical Models of X-ray Photoevaporation in Carbon Depleted Circumstellar Discs, Planet Formation and Evolution 2019, Rostock, Germany, February 2019.

## Talks

- Ali-Lagoa, V.: The thermal inertia of (16) Psyche revisited, contributed talk, Thermal Models for Planetary Science III, Hungarian Academy of Sciences, Budapest, Hungary, February 2019.
- Arcodia, R.: Testing the disk-corona interplay in broad-line AGN, contributed talk, Supermassive Black Holes: Environment and Evolution, Corfu, Greece, June 2019.
- Arcodia, R.: Testing the disk-corona interplay in broad-line AGN, contributed talk, From the Dolomites to the event horizon: sledging down the black hole potential well, Sexten, Italy, July 2019.
- Arcodia, R.: Testing the disk-corona interplay in broad-line AGN, contributed talk, X-ray Astronomy 2019, Bologna, Italy, September 2019.
- Arcodia, R.: Do stellar-mass and super-massive black holes have similar dietary habits?, contributed talk, AGN Spectral States: Unification of Black Holes across the Mass Scale, Prague, Czech Republic, November 2019.
- Bauböck, M.: Astrophysics at the Galactic Center, contributed talk, Lomonosov Conference on Elementary Particle Physics, Moscow, Russia, August 2019.
- Bauböck, M.: Models of Orbital Motion in the Galactic Center, contributed talk, Galactic Center Workshop 2019, Yokohama, Japan, October 2019.
- Bauböck, M.: Stellar Orbits and Infrared Flares at the Galactic Center, colloquium, DESY Zeuthen, Zeuthen, Germany, November 2019.
- Belli, S.: Fitting Spectroscopy and Photometry, invited talk, LEGA-C Survey Workshop, Ghent, Belgium, May 2019.
- Belli, S.: The Formation of Quiescent Galaxies, colloquium, INAF Arcetri, Florence, Italy, January 2019.
- Belli, S.: The Formation of Quiescent Galaxies, colloquium, INAF Padova, Padova, Italy, January 2019.
- Belli, S.: The Formation of Quiescent Galaxies, colloquium, Subaru Base, Hilo, HI, USA, November 2019.
- Belli, S.: The Formation of Quiescent Galaxies, colloquium, Seminar at Center for Astrophysics, Cambridge, MA, USA, January 2019.
- Belli, S.: The Formation of Quiescent Galaxies, colloquium, Tufts University, Medford, MA, USA, November 2019.
- Belli, S.: The Star Formation Histories of Massive Quiescent Galaxies at  $z \sim 2$ , invited talk, Subaru Telescope 20th Anniversary Symposium, Kona, HI, USA, November 2019.
- Bizzocchi, L.: Deuterated amidogen in the laboratory and in Space, contributed talk, Italian National Conference on Astrochemistry and Astrobiology, Duino, Italy, October 2019.
- Bizzocchi, L.: Millimeter-wave spectrum of  $\text{CH}_3\text{NHCN}$ , invited talk, Workshop on Nonrigid Molecules in Atmospheric and Astronomical Environments at the University of Huelva, Huelva, Spain, October 2019.
- Bodendorf, C.: Testing the near-infrared optical assembly of the space telescope Euclid, contributed talk, Astronomical Optics: Design, Manufacture, and Test of Space and Ground Systems II SPIE Conference, San Diego, USA, September 2019.
- Boller, Th.: Schwarze Löcher nah und fern, public talk, Reihe Cafe und Kosmos, Munich, Germany, July 2019.
- Boller, Th.: Accretion disc physics and black holes, invited talk, Havanna School on Physics, Havanna, Cuba, May 2019.
- Boller, Th.: The beginning and the end of the Universe, invited talk, 24th World Congress of Dermatology, Milan, Italy, June 2019.
- Boller, Th.: Unser Universum, public talk, Kinder und Jugendakademie Moosburg, Moosburg, Germany, January 2019.
- Bonholzer, M.: Electrical characterization of prototype DEPFET detectors for Athena's Wide Field Imager, contributed talk, SPIE Optical Engineering + Applications, San Diego, CA, USA, August 2019.
- Bonholzer, M.: Status of the wide field imager instrument for Athena, contributed talk, SPIE Optical Engineering + Applications, San Diego, CA, USA, August 2019.
- Bonholzer, M.: The DEPFET detectors of Athena's WFI: Status overview, contributed talk, 9th. Athena WFI Consortium Meeting, Garching, Germany, March 2019.
- Buchner, J.: What makes clumpy obscuration and X-ray occultation events?, contributed talk, Supermassive Black holes Environment & Evolution, Corfu, Greece, June 2019.
- Buchner, J.: Practical Bayesian inference with Nested Sampling and PyMultiNest, invited talk, Bayesian Inference in Subatomic Physics (Wallenberg Symposium), Göteborg, Sweden, September 2019.
- Buchner, J.: Special talk: X-ray spectral fitting methods and BXA, colloquium, Quasar Tea, Cambridge, USA, October 2019.
- Buchner, J.: The hidden Supermassive Black Hole population over cosmic time, colloquium, Quasar Tea, Cambridge, USA, February 2019.
- Buchner, J.: Population Inference and Nested Sampling methods, colloquium, Machine Learning Journal Club, Cambridge, USA, October 2019.
- Buchner, J.: eROSITA, public talk, radio show 'DasDing', Stuttgart, Germany, June 2019.

- Buchner, J.: X-ray spectral fitting methods, invited talk, X-ray spectral fitting methods workshop, Munich, Germany, September 2019.
- Bulbul, E.: Witnessing the Growth of Structure through X-ray Observations of Clusters of Galaxies, colloquium, Joint Astronomy Colloquium, Munich, Germany, December 2019.
- Burgess, J.M.: Synchrotron emission in GRBs, contributed talk, 12th INTEGRAL conference, Geneva, Switzerland, January 2019.
- Burgess, J.M.: The Multi-Mission Maximum Likelihood Framework, invited talk, PyGamma Workshop, Heidelberg, Germany, March 2019.
- Burgess, J.M.: Synchrotron emission in GRBs, invited talk, Nanjing GRB Conference, Nanjing, China, March 2019.
- Burgess, J.M.: Synchrotron emission in GRBs, invited talk, Ioffe Workshop on GRBs and other transient sources: 25 Years of Konus-Wind Experiment, St. Petersburg, Russia, September 2019.
- Burgess, J.M.: Synchrotron emission in GRBs, invited talk, Gamma-ray Bursts in the Gravitational Wave Era, Yokohama, Japan, October 2019.
- Carpano, S.: Time variability of X-ray sources with eROSITA instrument, contributed talk, The Future of X-ray Timing, Amsterdam, The Netherlands, October 2019.
- Caselli, P.: Astrochemistry at the dawn of star and planet formation, colloquium, Centro de Astrobiología (CSIC/INTA), Madrid, Spain, October 2019.
- Caselli, P.: Astrochemistry at the dawn of star and planet formation, colloquium, Facultat de Física, Universitat de Barcelona, Barcelona, Spain, March 2019.
- Caselli, P.: Astrochemistry at the dawn of star and planet formation, colloquium, Hamburg Photon Science Colloquium, Hamburg, Germany, May 2019.
- Caselli, P.: Astrochemistry at the dawn of star and planet formation, invited talk, The 30th International Symposium on Space Terahertz Technology (ISSTT 2019), Gothenburg, Sweden, April 2019.
- Caselli, P.: Deuterated forms of  $\text{H}_3^+$  and their importance in astrochemistry, invited talk, Advances in hydrogen molecular ions:  $\text{H}_3^+$ ,  $\text{H}_5^+$  and beyond, Discussion Meeting, The Royal Society, London, UK, January 2019.
- Caselli, P.: From pre-stellar cores to our Solar System: the astrochemical link, invited talk, Probing AGNs and Star Formation - observations and models, Onsala, Sweden, September 2019.
- Caselli, P.: Isotope fractionation in star formation, invited talk, Astrochemistry: from nanometers to megaparsecs - A Symposium in honour of John H. Black, Gothenburg, Sweden, June 2019.
- Caselli, P.: Le nostre origini astrochimiche, public talk, Società Ticinese di Scienze Naturali, Bellinzona, Switzerland, September 2019.
- Caselli, P.: Making life from stardust, public talk, Science Week, Chalmers House, Gothenburg, Sweden, September 2019.
- Caselli, P.: Our astrochemical origins, public talk, Bayerische Volkssternwarte, Munich, Germany, September 2019.
- Caselli, P.: Water at the dawn of star formation, invited talk, Water in the Universe, 258th National Meeting, The Astrochemistry Subdivision of the American Chemical Society, San Diego, USA, August 2019.
- Caselli, P.: Water at the earliest stages of star formation, invited talk, Millimetron Workshop, Paris, France, September 2019.
- Collmar, W.: The MeV-Sky as seen by CGRO/COMPTEL, colloquium, MPI für Kernphysik, Heidelberg, Germany, January 2019.
- Collmar, W.: The CGRO/COMPTEL Allsky Survey at MeV Energies, contributed talk, 12th INTEGRAL Conference / 1st AHEAD Gamma-ray Workshop, Geneva, Switzerland, February 2019.
- Collmar, W.: Gamma-Ray Binaries at soft MeV-Energies: The COMPTEL Status, contributed talk, Variable Galactic Gamma-Ray Sources (V), Barcelona, Spain, September 2019.
- Comparat, J.: An eROSITA mock catalog of Active Galactic Nuclei and their large-scale structure, colloquium, Instituto Astrofísica Andalucía (IAA), Granada, Spain, May 2019.
- Comparat, J.: An eROSITA mock catalog of Active Galactic Nuclei and their large-scale structure, colloquium, Helsinki University, Helsinki, Finland, January 2019.
- Comparat, J.: An eROSITA mock catalog of Active Galactic Nuclei and their large-scale structure. The low redshift survey at calar alto, contributed talk, Astro-plate III, Bamberg, Germany, March 2019.
- Comparat, J.: Consortium Survey 5 Galaxy Cluster Redshift Survey, invited talk, Preparing for 4MOST. A community workshop introducing ESO's next-generation spectroscopic survey facility, Garching, Germany, May 2019.
- Comparat, J.: Mapping the Universe, colloquium, Kurt Goedel Institute for Logic of Wien, Wien, Österreich, May 2019.
- Comparat, J.: Planning 4MOST, contributed talk, 4MOST all hands meeting, Potsdam, Germany, September 2019.
- Comparat, J.: SPIDERS DR16, contributed talk, SDSS-IV SPIDERS workshop, Toulouse, France, May 2019.
- Comparat, J.: SPIDERS update, contributed talk, SPIDERS workshop, Helsinki, Finland, January 2019.
- Comparat, J.: Simulating the eROSITA Sky, contributed talk, CosmoCruise 2019, Venice, Italy, August 2019.
- Comparat, J.: Updates on the Consortium Survey 5 Galaxy Cluster Redshift Survey, contributed talk, 4MOST all hands meeting, Potsdam, Germany, September 2019.
- Davies, R.L.: Properties and Scaling Relations of Ionized

- Gas Outflows at  $z \sim 1-3$ , colloquium, Macquarie University, Sydney, Australia, February 2019.
- Davies, R.L.: Properties and Scaling Relations of Ionized Gas Outflows at  $z \sim 1-3$ , contributed talk, Linking Galaxies from the Epoch of Initial Formation to Today, Sydney, Australia, February 2019.
- Davies, R.L.: Properties and Scaling Relations of Ionized Gas Outflows at  $z \sim 1-3$ , colloquium, Swinburne University of Technology, Melbourne, Australia, March 2019.
- Davies, R.L.: Properties and Scaling Relations of Ionized Gas Outflows at  $z \sim 1-3$ , colloquium, University of New South Wales, Sydney, Australia, February 2019.
- Davies, R.L.: Properties and Scaling Relations of Ionized Gas Outflows at  $z \sim 1-3$ , colloquium, University of Western Australia, Perth, Australia, December 2019.
- Davies, R.L.: Properties and Scaling Relations of Ionized Gas Outflows at  $z \sim 1-3$ , colloquium, Australian National University, Canberra, Australia, March 2019.
- Davies, R.: A clear view of the universe: Opportunities for high resolution imaging, invited talk, RAS Specialist Discussion Meeting: The Future of High-Resolution Imaging in the Visible and IR, London, UK, January 2019.
- Davies, R.: Imaging the high redshift universe with MICA-DO on the ELT, invited talk, Extremely Big Eyes on the Early Universe, Rome, Italy, September 2019.
- Davies, R.: MICADO sci-ops: shaping its adaptive optics systems, contributed talk, Adaptive optics for extremely large telescopes 6, Quebec, Canada, June 2019.
- Dennerl, K.: An empirical method for improving the XMM-Newton/EPIC-pn RMF and ARFs, contributed talk, 14th IACHEC meeting, 2019 Shonan Village Center, Japan, May 2019.
- Dennerl, K.: Calibration Uncertainties, contributed talk, X-ray spectral fitting methods, Garching (MPE), Germany, September 2019.
- Dennerl, K.: EPIC-pn RMF and ARF improvement: modeling temporal changes, contributed talk, EPIC Calibration and Operations Meeting, Madrid (ESAC), Spain, March 2019.
- Dennerl, K.: RX J1856.5-3754: Reaching consistency between Chandra LETG and XMM-Newton/EPIC-pn, contributed talk, 14th IACHEC meeting, Shonan Village Center, Japan, May 2019.
- Dennerl, K.: Randomization in spectral fitting, contributed talk, X-ray spectral fitting methods, Garching (MPE), Germany, September 2019.
- Dennerl, K.: Verification of the IACHEC model for the SNR 1E 0102.2-7219 with XMM-Newton/EPIC-pn, contributed talk, 14th IACHEC meeting, Shonan Village Center, Japan, May 2019.
- de Oliveira Alves, F.: Dust properties and magnetic fields: the wonders of disk polarization, invited talk, Workshop on Polarization in Protoplanetary Disks and Jets, Sant Cugat, Spain, May 2019.
- de Oliveira Alves, F.: Oficina de Astrofísica: Explorando o Cosmos, public talk, Ciência para Crianças, Casa do Brasil, Munich, Germany, May 2019.
- de Oliveira Alves, F.: The effects of magnetic fields on the dynamics of Young Stellar Objects, invited talk, European Week of Astronomy and Space Science, Lyon, France, June 2019.
- Dexter, J.: Imaging black holes: beyond the shadow, colloquium, University of Colorado, Boulder, Boulder, USA, September 2019.
- Dexter, J.: Imaging black holes: beyond the shadow, invited talk, JSI Workshop: The New Faces of Black Holes, Annapolis, USA, November 2019.
- Dexter, J.: Imaging black holes: beyond the shadow, invited talk, Northwestern University / CIERA, Evanston, USA, November 2019.
- Dexter, J.: Imaging supermassive black holes, invited talk, Humboldt Kolleg: Discoveries and Open Puzzles in Particle Physics and Gravitation, Kitzbühel, Austria, June 2019.
- de Zeeuw, T.: Integral Field Spectroscopy of Galaxies, colloquium, Padua University, Padua, Italy, March 2019.
- de Zeeuw, T.: Professor Adriaan Blaauw, colloquium, Observatory Seminar Leiden, Leiden, The Netherlands, April 2019.
- de Zeeuw, T.: MUSE and GRAVITY, colloquium, Institute of Advanced Study, Princeton, USA, May 2019.
- de Zeeuw, T.: GRAVITY on the VLT, colloquium, Australian National University, Canberra, Australia, November 2019.
- de Zeeuw, T.: Black Holes, public talk, Institute of Advanced Study, Princeton, USA, May 2019.
- de Zeeuw, T.: Reaching New Heights in Astronomy, public talk, Science Café, Principe Island, Portugal, May 2019.
- de Zeeuw, T.: Building the World's Largest Telescopes at ESO, public talk, NVWS Christiaan Huygens, Papendrecht, The Netherlands, September 2019.
- de Zeeuw, T.: Early Days of NOVA, public talk, Gala of Astronomy, Leiden, The Netherlands, December 2019.
- Eisenhauer, F.: 28 years of Galactic Center Observation from the La Silla and Paranal Observatories, invited talk, The La Silla Observatory - from the inauguration to the future, La Serena, Chile, March 2019.
- Eisenhauer, F.: GRAVITY: Towards faint science, all sky milliarcsec optical interferometric imaging, contributed talk, The Very Large Telescope in 2030, ESO, Garching, Germany, June 2019.
- Eisenhauer, F.: GRAVITY Tests of General Relativity and the Black Hole Paradigm in the Galactic Center, colloquium, BHI Colloquium, Cambridge, Massachusetts, USA, February 2019.
- Eisenhauer, F.: GRAVITY and VLTI - The Harvest from the First Two Years (Galactic Center, AGN, and Exoplanets), and a Bright Future ahead, colloquium, ASIAA Colloqui-

um, Taipei, Taiwan R.O.C., July 2019.

Eisenhauer, F.: GRAVITY, the Galactic Center, Relativity, and Massive Black Holes, colloquium, MPIfR, Bonn, Germany, November 2019.

Eisenhauer, F.: GRAVITY, the Galactic Center, Relativity, and Massive Black Holes, invited talk, Annual Science Meeting of the Excellence Cluster Origins, ESO, Garching, Germany, December 2019.

Eisenhauer, F.: General Relativistic Effects Around the Galactic Center Black Hole, invited talk, APS Meeting 2019, Denver, Colorado, USA, April 2019.

Eisenhauer, F.: New Faces of Black Holes Uncovered by GRAVITY. The Beauty of Dynamics, invited talk, 2019 JSI Workshop, Annapolis, Maryland, USA, November 2019

Eisenhauer, F.: Testing General Relativity in the Galactic Center, invited talk, From Einstein and Eddington to Ligo: 100 Years of Gravitational Light Deflection, Principe, Sao Tome and Principe, May 2019.

Eisenhauer, F.: The Galactic Center Black Hole with GRAVITY: Orbital Motion Close to the Last Stable Orbit during a Flare, and General Relativistic Effects in the Orbit of Stars, colloquium, CfA Colloquium, Cambridge, Massachusetts, USA, February 2019.

Eisenhauer, F.: The Galactic Center Black Hole - Testing Einstein's General Relativity and the Black Hole Paradigm, colloquium, KIT Colloquium, Karlsruhe, Germany, June 2019.

Endres, C.P.: The Cologne Database for Molecular Spectroscopy, CDMS: spectroscopic data for Astrochemists and Astrophysicists, invited talk, IAEA: "Technical Meeting on Standards and Software Tools for Atomic and Molecular Databases", Wien, Austria, November 2019.

Fabricius, M.: Diffuse Emission Line Regions in HETDEX, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.

Fabricius, M.: First science with HETDEX, invited talk, ESO Thirty Minute Talk, Santiago de Chile, Chile, February 2019.

Förster Schreiber, N.M.: Resolved Views of Galaxy Evolution at Cosmic Noon, colloquium, Astronomy Seminar, University of California Los Angeles, Los Angeles, USA, February 2019.

Gao, F.: GRAVITY science highlights and technical challenge/advance in near-infrared interferometry, colloquium, Nanjing University, Nanjing, China, June 2019.

Gao, F.: GRAVITY science highlights and technical challenge/advance in near-infrared interferometry, colloquium, National Astronomy Observatory of China, Beijing, China, June 2019.

Gao, F.: GRAVITY science highlights and technical challenge/advance in near-infrared interferometry, colloquium, Peking University, Beijing, China, June 2019.

Genzel, R.: Testing General Relativity with Infrared Interferometry in the Center of the Milky Way, invited talk,

Caltech, Cahill Center for Astronomy and Astrophysics, Pasadena, CA, USA, February 2019.

Genzel, R.: Testing General Relativity with Infrared Interferometry in the Center of the Milky Way, invited talk, CCA Colloquium, Flatiron Institute, Center for Computational Astrophysics, New York, USA, February 2019.

Genzel, R.: Testing General Relativity with Infrared Interferometry in the Center of the Milky Way, invited talk, Black Hole Initiative, CfA Harvard, USA, February 2019.

Genzel, R.: High Resolution Astronomy with Infrared Interferometry, invited talk, Tal Alexander Workshop on Dynamics and Accretion near Massive Black Holes, TAU, Tel Aviv, Israel, April 2019.

Genzel, R.: High Resolution Astronomy with Infrared Interferometry, colloquium, Special Physics Colloquium, Weizmann Institute of Science, Tel Aviv, Israel, May 2019.

Genzel, R.: Rotation Curves and the Distribution of Baryons and Dark Matter in  $z=0.6-2.5$  Star Forming Disks, colloquium, Hebrew University, Jerusalem, Israel, May 2019.

Genzel, R.: Testing General Relativity with Infrared Interferometry in the Center of the Milky Way, colloquium, University of Padova, Padova, Italy, May 2019.

Genzel, R.: Millimeter and sub-millimeter astronomy, invited talk, CTA Symposium Bologna, Bologna, Italy, May 2019.

Genzel, R.: Testing General Relativity with Infrared Interferometry in the Center of the Milky Way, invited talk, Galaxies and Dark Components of the Universe, Kloster Seeon, Germany, July 2019.

Genzel, R.: Testing GR and the Massive Black Hole Paradigm with Infrared Interferometry, invited talk, KIPAC/Department of Physics, Stanford University, USA, September 2019.

Genzel, R.: Evolution of Galactic Disks, invited talk, KICC 10th Anniversary Symposium, Kavli Institute, Cambridge, UK, September 2019.

Genzel, R.: Black Holes, invited talk, Wellcome Trust Common Leadership Meeting, MPG, Munich, Germany, September 2019.

Genzel, R.: Introduction for Edward C. Stone as 2019 Shaw Laureate in Astronomy, invited talk, Speech at Shaw Prize Award Presentation Ceremony, Hong Kong, China, September 2019.

Genzel, R.: Test der Allgemeinen Relativitätstheorie durch Infrarotinterferometrie am Galaktischen Zentrum, invited talk, Bad Honnefer Industriegespräch, Physikzentrum, Bad Honnef, Germany, October 2019.

Genzel, R.: Die Allgemeine Relativitätstheorie auf dem Prüfstand, public talk, Wilhelm-Förster Sternwarte, Berlin, Germany, October 2019.

Genzel, R.: The evolution of the ionized gas velocity dispersion in SG galaxies, invited talk, MIST 2019: Cosmic Turbulence and Magnetic Fields, Cargèse, France, November 2019.



- Genzel, R.: New Results on Rotation Curves and the Distribution of Baryons and Dark Matter in  $z=0.6-2.5$  Star Forming Disks, invited talk, ORIGINS Science Week, Garching, Germany, December 2019.
- Gerhard, O.: Angular momentum of early-type galaxies based on extended kinematics, colloquium, Institute of Astronomy, Univ. Cambridge, Cambridge, UK, September 2019.
- Gerhard, O.: Dynamics of the Milky Way bulge. A new 3D view from VIRAC and Gaia proper motions, invited talk, In the Balance: Stasis and Disequilibrium in the Milky Way, Kavli Institute for Theoretical Physics, Santa Barbara, USA, April 2019.
- Gerhard, O.: Kinematics and dynamics of the Milky Way from Gaia and big surveys, invited talk, Galaxies and Dark Components of the Universe, Kloster Seeon, Seeon, Germany, July 2019.
- Gerhard, O.: Milky Way large-scale structure, colloquium, Sydney Institute for Astronomy, Sydney, Australia, November 2019.
- Gerhard, O.: Structure and dynamics of the barred Milky Way, colloquium, Research School of Astronomy and Astrophysics, Australian National University, Canberra, Australia, November 2019.
- Gerhard, O.: The Milky Way bar and bulge, invited talk, IAU Symposium 353, Galactic Dynamics in the Era of Large Surveys, Shanghai, China, July 2019.
- Gerhard, O.: The Milky Way bulge/bar, invited talk, OGLE-ing the Variable Sky, Jahrestagung Astronomische Gesellschaft, Stuttgart, Germany, September 2019.
- Gerhard, O.: The dynamical properties and origin of the Milky Way stellar halo, invited talk, Light in the suburbs: structure and chemodynamics of galaxy halos, Sexten Center for Astrophysics, Sexten, Italy, June 2019.
- Gillessen, S.: Der Klang des Urknalls, public talk, Gymnasium Penzberg, Penzberg, Germany, March 2019.
- Gillessen, S.: General Relativistic Effects around the Galactic Center Black Hole, invited talk, Galactic Center Workshop 2019, Yokohama, Japan, October 2019.
- Gillessen, S.: Das Schwarze Loch im Zentrum der Milchstraße, public talk, Sternwarte Neumarkt, Neumarkt (Oberpfalz), Germany, June 2019.
- Gillessen, S.: Das Schwarze Loch im Zentrum der Milchstraße, public talk, Planetarium Freiburg, Freiburg, Germany, November 2019.
- Gillessen, S.: Das Schwarze Loch im Zentrum der Milchstraße, public talk, Sternwarte Feuerstein, Feuerstein, Germany, November 2019.
- Gillessen, S.: Einstein auf dem Prüfstand: Das Schwarze Loch im Zentrum der Milchstraße, public talk, Planetarium Stuttgart, Stuttgart, Germany, May 2019.
- Gillessen, S.: Latest news from the Galactic Center, invited talk, APS Meeting, Denver, USA, April 2019.
- Gillessen, S.: Schwarze Löcher - Science Fiction oder Realität?, public talk, Deutsches Museum Bonn, Bonn, Germany, December 2019.
- Gillessen, S.: Schwarze Löcher - Science Fiction oder Realität?, public talk, Taco Tuesday, Munich, Germany, September 2019.
- Gillessen, S.: Stellar Motions near the Galactic Center Black Hole, invited talk, IAU meeting 353: Galactic Dynamics in the Era of Large Surveys, Shanghai, China, July 2019.
- Gillessen, S.: Stellar motions near the Galactic Center black hole, invited talk, Conference: Stars on the run, Potsdam, Germany, 27.8.2019.
- Gillessen, S.: The massive black hole in the Galactic Center, invited talk, Very High Energy Phenomena Around Supermassive Black Holes, Yerevan, Armenia, April 2019.
- Giuliano, B.M.: Direct measurement of complex refractive index of CO ice using terahertz pulsed spectroscopy, contributed talk, Italian National Conference on Astrochemistry and Astrobiology, Duino, Italy, October 2019.
- Giuliano, B.M.: Direct measurements of the optical properties of CO ice in the THz range and opacity calculation, contributed talk, Astrochemistry: From nanometers to Megaparsecs - A Symposium in honour of John H. Black, Gothenburg, Sweden, June 2019.
- Gong, M.: Observing molecular clouds in numerical simulations, invited talk, AstroDat, Orsay, France, November 2019.
- Gong, M.: Post-processing chemistry and its applications to the XCO conversion factor, invited talk, Athena++ workshop 2019, Las Vegas, USA, March 2019.
- Gong, M.: Observing molecular clouds in numerical simulations, contributed talk, So-Star: the self-organised star formation process, Orsay, France, September 2019.
- Greiner, J.: Fermi/GBM as gamma-ray transient monitor, invited talk, Current themes in Gravitational Physics, Copenhagen, Denmark, August 2019.
- Greiner, J.: Fermi/GBM localisations of GRBs, contributed talk, GRBs and other transient sources: 25 Years of Konus-Wind Experiment, St. Petersburg, Russia, September 2019.
- Greiner, J.: The Fermi/GBM as gamma-ray transient monitor and more, contributed talk, GRBs in the Gravitational Wave era, Yokohama, Japan, October 2019.
- Greiner, J.: Skyhopper - ein 4-Kanal Nah-Infrarot Teleskop auf einem CubeSat, colloquium, Forum Munich Aerospace, Garching, Germany, November 2019.
- Grupp, F.: EUCLID NISP: Per Aspera Ad Astra, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.
- Grupp, F.: Die EUCLID Mission und das EUCLID NISP Instrument, invited talk, Deutsche Luft- und Raumfahrt conference, Darmstadt, Germany, October 2019.
- Grupp, F.: The EUCLID survey and its implication for stellar physics, invited talk, Future large spectroscopic sur-

ys conference, Yichang, China, October 2019.

Grupp, F.: Status of the planet activities at Wendelstein observatory, invited talk, Precise radial velocity spectroscopy conference, Busan, South Korea, October 2019.

Guglielmo, V.: Star formation properties of galaxies at  $0.1 < z < 0.5$  from the XXL survey, contributed talk, GEE6. The journey of galaxies in the assembling cosmic structure, Trieste, Italy, October 2019.

Haberl, F.: High-Mass X-ray binary pulsars at high accretion rates, invited talk, X-ray topics in Astronomy: from history to the future, Tübingen, Germany, April 2019.

Haberl, F.: X-ray surveys of the Magellanic Clouds - From XMM-Newton to eROSITA, contributed talk, ESO workshop: A synoptic view of the Magellanic Clouds: VMC, Gaia and beyond, Garching, Germany, September 2019.

Haerendel, G.: Kommunikation mit Außerirdischen, public talk, Vortrag in Campus Kultur, Technische Universität Kaiserslautern, Germany, January 2019.

Haerendel, G.: Meti - Botschaften für andere Welten, invited talk, "Sind wir allein?", Evangelische Akademie Tutzing, Germany, March 2019.

Haerendel, G.: On the energetics of active auroral arcs, contributed talk, "The Plasma Physics of the Magnetosphere", Bra-Pollenzo, Italy, June 2019.

Haerendel, G.: Extraterrestrial civilizations? - Scientific, philosophical and theological consequences, invited talk, EANA 2019: 19th EANA Astrobiology Conference, Orléans, France, September 2019.

Haerendel, G.: Three non-MHD processes acting at substorm onset, contributed talk, 14th International Conference on Substorms, Tromsø, Norway, October, 2019.

Herrera-Camus, R.: Galactic winds at the peak of cosmic star formation activity, invited talk, Linking galaxies from the epoch of initial star formation to today, Sydney, Australia, February 2019.

Hopp, U.: Observatorium Wendelstein – Status, Use and Future Strategy, contributed talk, Large surveys with small telescopes: Past, Present, and Future (Astroplate III) Conference, Bamberg, Germany, March 2019.

Hopp, U.: The Wendelstein Observatory, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.

Ivlev, A.: Cosmic ray transport in molecular clouds and circumstellar disks, invited talk, International Space Science Institute, Bern, Switzerland, May 2019.

Ivlev, A.: Galactic Cosmic Rays, colloquium, Scuola Normale Superiore di Pisa, Pisa, Italy, March 2019.

Ivlev, A.: Gamma-Ray Emission from Molecular Clouds Generated by Penetrating Cosmic Rays, contributed talk, 12th Integral Conference, Geneva, Switzerland, February 2019.

Ivlev, A.: Low-energy cosmic rays and molecular clouds, invited talk, California Institute of Technology, Pasadena, USA, September 2019.

Ivlev, A.: Low-energy cosmic rays in clouds and disks, invited talk, Gran Sasso Science Institute, L'Aquila, Italy, May 2019.

Ivlev, A.: Penetration of Cosmic Rays into Dense Molecular Clouds, contributed talk, 36th International Cosmic Ray Conference, Madison, USA, July 2019.

Ivlev, A.: Penetration of cosmic rays into dense molecular clouds, invited talk, Stanford University, Stanford, USA, September 2019.

Jimenez-Rosales, A.: A few ideas on how to use spatial polarisation information from simulations, invited talk, EHT Polarisation workshop, Bonn, Germany, July 2019.

Jimenez-Rosales, A.: Overview on Polarisation theory, invited talk, Event Horizon Telescope Collaboration Meeting, Hilo, USA, December 2019.

Jimenez-Rosales, A.: Polarisation signatures of hotspots around Sgr A\*, colloquium, Anton Pannekoek Institute, Amsterdam, Netherlands, June 2019.

Jimenez-Rosales, A.: Polarisation signatures on event horizon scales of accreting black holes, contributed talk, New Horizons in Galactic Center Astronomy and Beyond, Yokohama, Japan, October 2019.

Käfer, F.: Towards a characterisation of X-ray galaxy clusters for cosmology, colloquium, Astrophysics seminar, Helsinki, Finland, February 2019.

Käfer, F.: X-ray galaxy cluster detection by outskirts, contributed talk, Alpine Cosmology Workshop, La Berarde, France, June 2019.

Klecker, B.: Energiereiche Teilchen in der Magnetosphäre der Erde: Erkenntnisse von AZUR bis zu den Van Allen Probes, colloquium, Festkolloquium zum 50. Jahrestag des Starts der AZUR Sonde, Christian-Albrechts-Universität Kiel, Germany, November 2019.

Kluge, M.: Structure of Brightest Cluster Galaxies, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.

Lee, M.: Cold interstellar medium in  $z=2.49$  protocluster galaxies, contributed talk, The 2nd Forum on Gas and Galaxies: Multiple-phase ISM - Probing the Activities and Power Engines from Local to Distant Universe, Beijing, China, September 2019.

Lippich, M.: Comparing approximate methods for mock catalogues and covariance matrices, contributed talk, Mock Córdoba: Galaxy formation for gravity and cosmology conference, Córdoba, Argentina, April 2019.

Lutz, D.: Herschel extragalactic deep surveys: Results and legacy, invited talk, Herschel 10 years after launch, Villafranca, Spain, May 2019.

Lutz, D.: Molecular outflows in the local universe, contributed talk, Views on the Interstellar Medium in Galaxies in the ALMA era, Bologna, Italy, September 2019.

Maitra, C.: X-ray identification of AGN behind the Magellanic Clouds, contributed talk, VMC - 11th Consortium Meeting, Cambridge, UK, June 2019.

- Maitra, C.: Unveiling the intriguing nature of PSR J0855-4644 through a Chandra observation: Why no Gamma rays?, contributed talk, 20 years of Chandra, Boston, USA, December 2019.
- Mehrgan, K.: Supermassive Black Holes environment and evolution, contributed talk, Supermassive Black Holes environment and evolution Conference, Corfu, Greece, June 2019.
- Mehrgan, K.: A 40-Billion Solar Mass Black Hole in the unusual central Galaxy of Abell 85, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.
- Meidinger, N.: Athena WFI Status Overview, contributed talk, Athena WFI Consortium Meeting, Garching, Germany, March 2019.
- Meidinger, N.: CCD Detector Module, contributed talk, CAS/ESA/MPE 2nd Einstein Probe Workshop, Garching, Germany, November 2019.
- Meidinger, N.: Einstein Probe FXT Detector Status, contributed talk, MPE/CAS meeting on EP and eXTP, Beijing, China, April 2019.
- Meidinger, N.: WFI Project Status Overview, contributed talk, 10th WFI Consortium Meeting, Strasbourg, France, October 2019.
- Meidinger, N.: eRosita Cameras Commissioning Status Report, contributed talk, eROSITA Consortium Meeting, Garching, Germany, October 2019.
- Merloni, A.: The 4MOST eROSITA AGN survey, invited talk, ESO Workshop: 4MOST, Garching, Germany, May 2019.
- Merloni, A.: eROSITA on SRG, invited talk, 4MOST Allhands Meeting, Potsdam, Germany, September 2019.
- Merloni, A.: eROSITA on SRG, invited talk, GLOW Annual meeting, Dortmund, Germany, October 2019.
- Merloni, A.: eROSITA on SRG, invited talk, X-ray Astronomy 2019, Bologna, Italy, September 2019.
- Merloni, A.: eROSITA on SRG, invited talk, J-PAS collaboration meeting, Teruel, Spain, December 2019.
- Merloni, A.: eROSITA: Mapping the Hot Universe, colloquium, Scuola Normale Superiore di Pisa, Pisa, Italy, March 2019.
- Merloni, A.: eROSITA: Mapping the Hot Universe, colloquium, University of Southampton, Southampton, UK, June 2019.
- Müller, T.: Thermal IR modelling of near-Earth asteroids, contributed talk, Workshop on "Holistic characterization of near-Earth asteroids (HOLICON)", University of Helsinki, Helsinki, Januar 2019.
- Müller, T.G.: Small Bodies Near and Far, colloquium, University of Poznan, Poznan, Poland, May 2019.
- Müller, T.G.: Ryugu - A fascinating asteroid, colloquium, Max-Planck-Institut für Sonnenforschung, Göttingen, Germany, September 2019.
- Müller, T.G.: Hayabusa2-TIR measurements: thermal properties of Ryugu, colloquium, ISAS, Tokyo, December 2019.
- Müller, T.G.: Asteroiden: Gefahr aus dem All?, public talk, Nicolaus-Copernicus-Planetarium Nürnberg, Nürnberg, Germany, February 2019.
- Müller, T.G.: Schwetzingen im Weltall, public talk, Stadt Schwetzingen, Germany, March 2019.
- Müller, T.G.: Asteroiden: Gefahr aus dem All?, public talk, ESO Supernova, Garching, Germany, May 2019.
- Müller, T.G.: Die Hayabusa2 Mission zu Ryugu, public talk, Asteroid day, ESO Supernova, Garching, Germany, June 2019.
- Müller, T.G.: Asteroiden: Gefahr aus dem All?, public talk, Asteroid day, ESO Supernova, Garching, Germany, June 2019.
- Müller, T.G.: Bad Königshofen im Weltall, public talk, Bad Königshofen, Germany, July 2019.
- Müller, T.G.: Asteroiden unter der Lupe: Lebensbringer oder Gefahr aus dem All?, public talk, VHS Garching, Garching, Germany, November 2019.
- Müller, T.: European Stratospheric Balloon Observatory (ESBO) - Identification of Planetary Science Applications, contributed talk, EPSC-DPS Joint Meeting 2019, Geneva, Switzerland, September 2019.
- Müller, T.: Thermophysical modelling of Centaurs & TNOs, contributed talk, Thermal Models for Planetary Science III, Hungarian Academy of Sciences, Budapest, Hungary, February 2019.
- Müller, T.: The Moon as flux calibrator for TIR measurements of Ryugu during the Hayabusa2 approach phase in June 2018, contributed talk, Thermal Models for Planetary Science III, Hungarian Academy of Sciences, Budapest, Hungary, February 2019.
- Müller-Seidlitz, J.: First Results from Flight-like Sensors for Athena's Wide Field Imager, contributed talk, IEEE NSS/MIC, Manchester, UK, October 2019.
- Nandra, K.: Athena: The ESA mission to explore the Hot and Energetic Universe, invited talk, 17th HEAD Meeting High Energy Astrophysics Division, Monterey, USA, March 2019.
- Nandra, K.: Athena, invited talk, X-ray Astronomy 2019—Current Challenges and New Frontiers in the next Decade, Bologna, Italy, September 2019.
- Nandra, K.: Athena Project Status, invited talk, 10th Meeting of the WFI Consortium, Strasbourg, France, October 2019.
- Nandra, K.: eROSITA Aboard Spectrum-RG: Status and First results, contributed talk, 20 years of Chandra, Boston, USA, December 2019.
- Nandra, K.: Overview of the Athena Mission, invited talk, X-ray Astrophysics from XMM-Newton to Athena, Royal Astronomical Society, London, UK, December 2019.
- Neureiter, B.: Triaxial Dynamical Modeling, invited talk,

Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.

Obermeier, C.: Surveying exoplanets across the spectrum - following the TraCS of exoplanets, contributed talk, Large surveys with small telescopes: Past, Present, and Future (Astroplate III) Conference, Bamberg, Germany, March 2019.

Pfuhl, O.: Supermassive black holes and young planets seen at milli-arcsecond resolution with GRAVITY, invited talk, Tal Alexander workshop, Tel Aviv University, Tel Aviv, Israel, April 2019.

Pfuhl, O.: The black hole at the center of the Milky way - seen with GRAVITY, public talk, International Astronomical Union Amateur Day Event, Brussels, Belgium, April 2019.

Pfuhl, O.: Tests of General Relativity and the Black Hole Paradigm with GRAVITY, invited talk, Racah Institute of Physics, The Hebrew University of Jerusalem, Jerusalem, Israel, March 2019.

Predehl, P.: eROSITA und die Dunkle Energie, public talk, Planetarium Mannheim, Germany, November 2019.

Predehl, P.: Latest News from eROSITA in Orbit, colloquium, ESOC, Darmstadt, Germany, November 2019.

Predehl, P.: The X-ray Telescope eROSITA on the Russian/German Space Mission SRG, invited talk, AXRO conference, Prague, Czech Republic, December 2019.

Predehl, P.: eROSITA: Status, Calibration, Observations, and Plans, invited talk, HEA2019 conference, Moscow, Russia, December 2019.

Price, S.H.: Disk structure, turbulence, and dark matter in star-forming galaxies at  $z \sim 0.7-3.8$ , invited talk, KIAA Second Forum on Gas in Galaxies, Beijing, China, September 2019.

Price, S.H.: Galaxies at high redshift: Insights from IFU+MOS observations at  $z \sim 1-3$ , invited talk, MOSAIC 2019 Science meeting, Heidelberg, Germany, March 2019.

Price, S.H.: Resolved Views of Galaxy Evolution at Cosmic Noon, invited talk, Revolutionary Spectroscopy of Today as a Springboard to Webb, Leiden, The Netherlands, October 2019.

Pulsoni, C.: The outer halos of ETGs in observations and simulations, contributed talk, Light in the suburbs: structure and chemodynamics of galaxy halos Conference, Sesto, Italy, June 2019.

Rau, A.: Athena Mission Status, invited talk, Athena UK Community Meeting, MSSL, UK, September 2019.

Rau, A.: Prospects for Tidal Disruption Event Studies with Einstein Probe, contributed talk, CAS/ESA/MPE Workshop on Einstein Probe, Garching, Germany, November 2019.

Rau, A.: Spectrum-Röntgen-Gamma (SRG), invited talk, TDA-MMS Meeting, Tokyo, Japan, February 2019.

Rau, A.: The Athena X-ray Observatory, invited talk, AG Ta-

gung 2019, Stuttgart, Germany, September 2019.

Redaelli, E.: Deuteration of  $N_2H^+$  and  $HCO^+$  in the prestellar core L1544, contributed talk, Stars and Planets Formation Seminar, Garching, Germany, June 2019.

Redaelli, E.: Fractionation processes: A key to unveil our origins, colloquium, Istituto di Radioastronomia, Bologna, Italy, October 2019.

Redaelli, E.: Molecular fractionation in low-mass star forming regions, contributed talk, Young European Radio Astronomers Conference, Dublin, Ireland, August 2019.

Redaelli, E.: Polarimetry in the class 0 protostar B228 with SOFIA/hawc+ instrument, contributed talk, SOFIA2019 workshop, Ringberg Castle, Germany, January 2019.

Redaelli, E.: Unveiling the magnetic field properties of a class 0 protostar with SOFIA/hawc+, contributed talk, Astronomische Gesellschaft Annual Meeting 2019, Stuttgart, Germany, September 2019.

Riffeser, A.: Microlensing survey of M31 with the 2m Wendelstein telescope, contributed talk, Large surveys with small telescopes: Past, Present, and Future (Astroplate III) Conference, Bamberg, Germany, March 2019.

Rosensteiner, M.: The PSF reconstruction plan for MICADO, contributed talk, AO4ASTRO workshop, Marseille, France, March 2019.

Saglia, R.P.: 30 years of ellipticals together, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.

Salvato, M.: X-ray sources characterization through multiwavelength surveys, invited talk, X-ray Surveys of the Hot and Energetic Universe, Harbin, China, January 2019.

Salvato, M.: AGN studies in the era of wide-angle and all-sky surveys, colloquium, UNIGE- Observatory of Geneva, Geneva, Switzerland, May 2019.

Salvato, M.: Counterparts to X-ray sources using NWAY, contributed talk, Hyper-Suprime-Camera/eROSITA F2F, Munich, Germany, May 2019.

Salvato, M.: eBOSS/SPIDERS: an update, contributed talk, SDSS Collaboration Meeting, Ensenada, Mexico, June 2019.

Salvato, M.: eROSITA on SRG: a dream come true, contributed talk, EMU international meeting, Catania, Italy, October 2019.

Salvato, M.: eROSITA on SRG: a dream come true, invited talk, ORIGINS science day, Munich, Germany, December 2019.

Sanchez, A.: Constraining  $\Lambda$ CDM with galaxy clustering measurements, invited talk, Science Week of the ORIGINS Excellence Cluster, Garching, Germany, December 2019.

Sanchez, A.: Cosmology & LSS at MPE, invited talk, Cambridge - LMU Cosmology Meeting, Munich, Germany, April 2019.

Sanchez, A.: The information content of LSS measure-

- ments, invited talk, Mock Cordoba Conference, Cordoba, Argentina, April 2019.
- Sanchez, A.: Baryon acoustic oscillations and redshift-space distortions, colloquium, Pontificia Universidad Catolica de Chile, Santiago, Chile, January 2019.
- Sanchez, A.: The information content of anisotropic clustering measurements, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.
- Sanders, J.S.: Galaxy cluster observations: structure and dynamics of the intracluster medium, invited talk, Astrophysics of Hot Plasma in Extended X-ray Sources, Madrid, Spain, June 2019.
- Sanders, J.S.: Studying the physics of clusters of galaxies using X-ray observations, invited talk, X-ray Astronomy 2019, Bologna, Italy, September 2019.
- Schruba, A.: High Resolution Census of the Baryon Cycle in Nearby Galaxies, colloquium, Joint University and Observatory Colloquium, Geneva, Switzerland, September 2019.
- Schruba, A.: Physics, Chemistry and Star Formation of Molecular Clouds, invited talk, Zoom-in and out: From the ISM to Large Scale Structure, Stockholm, Sweden, June 2019.
- Schruba, A.: Surveying the Cloud-scale Star Formation Process across the Nearby Galaxy Population, colloquium, Chalmers Astronomy Colloquium, Gothenburg, Sweden, October 2019.
- Schruba, A.: The Cloud-scale Baryon Cycle of Nearby Galaxies, contributed talk, Views on the Interstellar Medium in Galaxies in the ALMA Area, Bologna, Italy, September 2019.
- Schruba, A.: The Multi-wavelength View of Nearby Galaxies from Cloud to Galaxy Scales, colloquium, Cosmic Origins Seminar, Gothenburg, Sweden, October 2019.
- Schönfelder, V.: Die geschichtliche Entwicklung des Compton Teleskops, invited talk, Compton Kameras in der Medizin, Jena, Germany, August 2019.
- Seitz, S.: Forever young and exciting: 20 years of gravitational lensing at USM, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.
- Shangguan, J.: BLR Modeling from Near-IR Interferometry, and the Hot Dust Size - AGN Luminosity Relation, contributed talk, Mapping Central Regions of Active Galactic Nuclei, Guilin, China, September 2019.
- Shangguan, J.: GRAVITY Near-Infrared Interferometry and High Spatial Resolution AGN Science, colloquium, The National Astronomical Observatories of the Chinese Academy of Sciences, Beijing, China, September 2019.
- Shingledecker, C.N.: A Tour of the Molecular Universe, colloquium, Old Dominion University, Norfolk, USA, October 2019.
- Shingledecker, C.N.: Modeling Dust-grain Ice Mantles in the JWST Era, colloquium, NRAO/UVa Colloquium, Charlottesville, USA, October 2019.
- Shingledecker, C.N.: Astrochemistry: A story of how molecules are made and destroyed space, colloquium, Institute for Theoretical Chemistry: University of Stuttgart, Stuttgart, Germany, March 2019.
- Shingledecker, C.N.: Interstellar PAHs: A View from 30,000 ft, invited talk, GOTHAM Team Meeting, Green Bank, USA, October 2019.
- Shingledecker, C.N.: New Frontiers in Astrochemical Modeling, colloquium, INAF-Osservatorio Astrofisico di Arcetri, Florence, Italy, September 2019.
- Shingledecker, C.N.: Simulating Ion-Irradiation Experiments Using Astrochemical Models, contributed talk, From Nanometers to Megaparsecs: A Symposium in Honor of John Black, Gothenburg, Sweden, June 2019.
- Silsbee, K.: Cosmic Rays in Molecular Clouds: Transport Models and Observational Constraints, contributed talk, The Self-Organized Star Formation Process, Orsay, France, October, 2019.
- Sipilä, O.: Modeling deuterium chemistry in dense cores: full scrambling versus proton hop, contributed talk, Astrochemistry: From nanometers to megaparsecs, Gothenburg, Sweden, June 2019.
- Spezzano, S.: The power of molecular spectroscopy in Astrophysics, colloquium, OPINAS Seminar, Max Planck Institute for Extraterrestrial Physics, Garching, Germany, 22/7/2019.
- Spezzano, S.: The quest for complex organic molecules in the interstellar medium: the role of laboratory spectroscopy, colloquium, Institute Seminar, Department of chemistry "G. Ciamician", University of Bologna, Bologna, Italy, October 2019.
- Straub, O.: GRAVITY: GR in the Galactic Centre, invited talk, RAGtime 21, Opava, Czech Republic, September 2019.
- Straub, O.: General Relativity with GRAVITY/VLT, invited talk, EPS 2019 European Physical Society Conference, Rome, Italy, February 2019.
- Straub, O.: Observational signatures of strong gravity in accretion discs, invited talk, 689. WE-Heraeus-Seminar on "Accretion in strong gravity", Bad-Honnef, Germany, February 2019.
- Straub, O.: Woher kommen die radioaktiven Elemente?, public talk, Marie Curie: television documentary for children, Broadcast: 12.01.2020 at KiKa (ARD/ZDF) and online, Paris/Munich, France/Germany, October 2019.
- Sturm, E.: Extragalactic Molecular Outflows and Feedback, invited talk, Herschel Ten Years After Launch: Science and Celebration, ESA/ESAC, Villafranca del Castillo, Spain, May 2019.
- Sturm, E.: Resolving AGN central engines with GRAVITY, invited talk, Mapping Central Regions of Active Galactic Nuclei, Guilin, China, September 2019.

Sturm, E.: Resolving AGN central engines with GRAVITY, colloquium, Thirty Minute Talk (TMT) Institute Seminar, ESO Vitacura, Chile, July 2019.

Sturm, E.: The core of the matter - spatially resolving the nuclei of Active Galaxies with VLTI/GRAVITY, colloquium, Institute Seminar, Erlangen Center for Astroparticle Physics (ECAP), Germany, December 2019.

Sturm, E.: The core of the matter - spatially resolving the nuclei of Active Galaxies with VLTI/GRAVITY, colloquium, Munich Joint Astronomy Colloquium (JAC), ESO, Garching, Germany, November 2019.

Tacconi, L.J.: How Can We Best Characterize the Cold Dense ISM Mass at  $z > 1$  (or any Redshift)?, invited talk, MIAPP Workshop on Nine Billion Years of Neutral Gas Evolution, Garching, Germany, July 2019.

Tacconi, L.J.: The Early Evolution of Galactic Disks: Dense Gas & Star Formation, invited talk, Astrochemistry: from Nanometers to Megaparsecs - a Symposium in Honor of John Black, Gothenburg, Sweden, June 2019.

Tacconi, L.J.: The Evolution of Galaxies and Supermassive Black Holes: Status and Outlook with the VLT(I), contributed talk, The Very Large Telescope in 2030, Garching, Germany, June 2019.

Tacconi, L.J.: The Voyage 2050 Process, invited talk, Voyage 2050 workshop: Shaping the European Space Agency's Space Science plan for 2035-2050, Madrid, Spain, October 2019.

Tacconi, L.J.: What Causes the Increase in Velocity Dispersion at High-Redshift?, contributed talk, Cosmic Turbulence and Magnetic Fields, Cargese, France, November 2019.

Thomas, J.: Invisible Mass at all radii: orbit models of ellipticals, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.

Trümper, J.: Jürgen Schmitt's 14 Years at MPE and his Role in the ROSAT Mission, invited talk, Emertierung Prof. Dr. J. Schmitt, University Hamburg, Hamburg, Germany, March 2019.

Trümper, J.: ROSAT - A Key Project in Astronomy and Extraterrestrial Physics, invited talk, "Arne Richter Lecture" at DPG Spring meeting, Munich, Germany, March 2019.

Trümper, J.: Looking back on 57 years with Rüdiger Staubert, invited talk, Workshop "X-ray topics in Astronomy: From history to the future", IAAT Tübingen, Tübingen, Germany, April 2019.

Trümper, J.: Neutronensterne und Schwarze Löcher, invited talk, Initiativkreis Albert-Einstein-Haus, Caputh, Germany, May 2019.

Trümper, J.: The Moon and the Hoary Deep, invited talk, Memorial Symposium to Honor Riccardo Giacconi, Washington DC, USA, May 2019.

Trümper, J.: Constraining the supersaturation density equation of state by neutron star observations, invited talk, ECT Trento Workshop "The first compact star merger event", Trento, Italy, October 2019.

Trümper, J.: Lead-up from ROSAT to XMM-Newton, invited talk, XMM-Newton 20th Anniversary meeting (ESAC), Madrid, Spain, December 2019.

Übler, H.: Kinematics of  $z=1-2$  star-forming galaxies with KMOS3D: intrinsic velocity dispersion, colloquium, Galaxy and Cosmology Seminar, Harvard-Smithsonian Center for Astrophysics, Cambridge, USA, December 2019.

Übler, H.: Kinematics of  $z=1-2$  star-forming galaxies with KMOS3D: velocity dispersions and rotation curves, invited talk, Revolutionary Spectroscopy of Today as a Springboard to Webb, Leiden, The Netherlands, October 2019.

van Dishoeck, E.F.: Astrochemistry and quantum chemistry: a happy marriage, invited talk, Physics@Veldhoven conference, Eindhoven, Netherlands, January 2019.

van Dishoeck, E.F.: Astrochemistry on solar system scales, invited talk, From Stars to Planets II, Gothenburg, Sweden, June 2019.

van Dishoeck, E.F.: Astrochemistry: the next 40 years, invited talk, Physics and Chemistry of the ISM, Avignon, France, September 2019.

van Dishoeck, E.F.: Building blocks for life in space, public talk, Netherlands Space Organization conference, Noordwijk, Netherlands, January 2019.

van Dishoeck, E.F.: Building stars, planets and the ingredients for life in space, public talk, Traektoria Foundation, St. Petersburg, Russia, September 2019.

van Dishoeck, E.F.: Building stars, planets and the ingredients for life in space, invited talk, Kavli astrophysics symposium, Bergen, Norway, September 2019.

van Dishoeck, E.F.: Building stars, planets and the ingredients for life in space, public talk, Beijing Planetarium, Beijing, China, October 2019.

van Dishoeck, E.F.: Building stars, planets and the ingredients for life in space: the critical role of dust, invited talk, Nanoworld symposium, Marseille, France, July 2019.

van Dishoeck, E.F.: Chemistry in disks, invited talk, Planet-forming Disks workshop, Lake Como, Italy, March 2019.

van Dishoeck, E.F.: From clouds to comets, invited talk, ROSINA Lorentz Center workshop, Leiden, Netherlands, October 2019.

van Dishoeck, E.F.: How to build stars and planets?, public talk, IAU 100yr Amateur Day, Brussels, Belgium, April 2019.

van Dishoeck, E.F.: IAU Today and Tomorrow: celebrating a century of astronomy and what it brings to society, invited talk, IAU 100 yr symposium, Rome, Italy, May 2019.

van Dishoeck, E.F.: IAU Today and Tomorrow: celebrating a century of astronomy and what it brings to society, invited talk, IAU Symposium 358 on Equity, Inclusion and Diversity, Tokyo, Japan, November 2019.

van Dishoeck, E.F.: IAU Today and Tomorrow: celebrating a century of astronomy and what it brings to society, invited talk, UNOOSA conference, Regional Center for Space

Science and Technology Education, Amman, Jordan, March 2019.

van Dishoeck, E.F.: IAU Today and Tomorrow: celebrating a century of astronomy and what it brings to society, public talk, IAU 100yr symposium, Prague, Czech republic, March 2019.

van Dishoeck, E.F.: IAU100: celebrating a century of astronomy and what it brings to society, public talk, China Tianquanhu Astronomy Forum, Nanjing, China, October 2019.

van Dishoeck, E.F.: IAU@100: celebrating a century of astronomy and what it brings to society, contributed talk, Astronomische Gesellschaft, Stuttgart, Germany, September 2019.

van Dishoeck, E.F.: IAU@100: celebrating a century of astronomy and what it brings to society, public talk, Starmus Festival, Zurich, Switzerland, June 2019.

van Dishoeck, E.F.: Isotope selective photodissociation and its applications to astrophysics, invited talk, Astrochemistry: from nanometers to megaparsecs, Gothenburg, Sweden, June 2019.

van Dishoeck, E.F.: Laboratory astrophysics as key to understanding the Universe, invited talk, IAU Symposium 350 on Laboratory Astrophysics, Cambridge, UK, April 2019.

van Dishoeck, E.F.: Molecular processes between the stars, colloquium, Larmor lecture, Queen's University, Belfast, UK, December 2019.

van Dishoeck, E.F.: Molecules from clouds to disks and planets, colloquium, Institute of Astronomy, Tokyo, Japan, November 2019.

van Dishoeck, E.F.: Molecules from clouds to disks and planets, colloquium, Purple Mountain Observatory, Nanjing, China, October 2019.

van Dishoeck, E.F.: Molecules from clouds to disks and planets, invited talk, Astronomische Gesellschaft, Stuttgart, Germany, September 2019.

van Dishoeck, E.F.: Molecules from clouds to disks and planets, invited talk, Brian Mitchell symposium, Rennes, France, February 2019.

van Dishoeck, E.F.: Origin of elements and chemistry in outer space, invited talk, XXI Mendeleev congress, St. Petersburg, Russia, September 2019.

van Dishoeck, E.F.: Origin of elements in outer space, invited talk, Opening International Year of Periodic Table, Unesco, Paris, France, January 2019.

van Dishoeck, E.F.: Our origins in space, invited talk, MPIA 50 yr symposium, Heidelberg, Germany, September 2019.

van Dishoeck, E.F.: Recent results on protoplanetary disks with ALMA, colloquium, Astrophysics Department, Princeton University, Princeton, USA, May 2019.

van Dishoeck, E.F.: Where do we come from?, invited talk, 50 yr Moonlanding symposium, Bern, Switzerland, June 2019.

van Dishoeck, E.F.: Where do we come from?, public talk,

Cheltenham Science festival, Cheltenham, UK, June 2019.

van Dishoeck, E.F.: Where do we come from?, public talk, Ghana Planetarium, Accra, Ghana, May 2019.

van Dishoeck, E.F.: Where do we come from?, public talk, Space Sciences Center Abudja, Abudja, Nigeria, May 2019.

van Dishoeck, E.F.: Zooming into planet-forming zones of disks with ALMA, colloquium, Astronomy Department, Nanjing University, Nanjing, China, October 2019.

van Dishoeck, E.F.: Zooming into planet-forming zones of disks with ALMA, colloquium, Geneva Observatory, Geneva, Switzerland, October 2019.

van Dishoeck, E.F.: Zooming into planet-forming zones of disks with ALMA, colloquium, NAOC, Beijing, China, October 2019.

van Dishoeck, E.F.: Zooming into planet-forming zones of disks with ALMA, colloquium, Shanghai Observatory, Shanghai, China, October 2019.

van Dishoeck, E.F.: Zooming into planet-forming zones of disks with ALMA, colloquium, Yunnan Observatory, Kunming University, Kunming, China, October 2019.

van Dishoeck, E.F.: Zooming into planet-forming zones of disks with ALMA, public talk, Center for Advanced Studies, Munich, Germany, November 2019.

van Dishoeck, E.: IAU Today and Tomorrow: celebrating a century of astronomy and what it brings to society, invited talk, IAU 100 yr Flagship Event, Brussels, Belgium, April 2019.

van Dishoeck, E.: What have we learned about the origin of our solar system from Moon landings?, colloquium, Leiden Observatory, Leiden, Netherlands, July 2019.

von Fellenberg, S.: A detection of Sgr A\* in the far infrared, contributed talk, The Galactic Center Workshop, Yokohama, Japan, November 2019.

von Fellenberg, S.: Stellar populations in the heart of our Galaxy, invited talk, The Galactic Center Workshop, Yokohama, Japan, November 2019.

von Kienlin, A.: Fermi-GBM GRBs with characteristics similar to GRB 170817A, invited talk, Ioffe Workshop on GRBs and other transient sources: 25 Years of Konus-Wind Experiment, St. Petersburg, Russia, September 2019.

von Kienlin, A.: Kollisionen von Neutronensternen, Gammablitz - Ein Augenzeuge berichtet, public talk, Abendvortrag am Simon-Marius-Gymnasium, Gunzenhausen, Germany, April 2019.

Waisberg, I.: Optical Interferometry of a Microquasar: Resolving Super-Eddington Outflows in SS 433, colloquium, IPAG, Grenoble, France, March 2019.

Waisberg, I.: SS 433: unique laboratory for accretion-jet physics and binary evolution, colloquium, Weizmann Institute, Rehovot, Israel, January 2019.

Weller, J.: Cosmology with Clusters of Galaxies, invited talk, Munich Extragalactic Anniversaries Conference, Kloster Seeon, Germany, July 2019.

Winkler, M.: Seasons in the Sun - UV stability of RNA's building blocks, contributed talk, Emergence of Life: Summer School, Regensburg, Germany, June 2019.

Wolf, J.: Searching for high-redshift AGN in the eFEDS field, contributed talk, HSC-eROSITA DE Joint Collaboration Meeting, Garching bei München, Germany, May 2019.

Wolf, J.: Searching for high-redshift Active Galactic Nuclei with eROSITA, contributed talk, ORIGINS Science Week 2019, Garching bei München, Germany, December 2019.

Wölfer, L.: Radiation-Hydrodynamical Models of X-ray Photoevaporation in Carbon Depleted Circumstellar Discs, contributed talk, Great Barriers in Planet Formation, Palm Cove, Australia, July 2019.

Zhao, B.: Protostellar Disk Formation & Fragmentation Enabled by Removal of Small Dust Grains, invited talk, ASI-AA Colloquium, Taipei, Taiwan, May 2019.

Zhao, B.: The Role of Chemistry on Non-ideal MHD Effects and Protostellar Disk Formation, invited talk, ISSI Star Formation Workshop, Bern, Switzerland, May 2019.



## PhD Theses

- Behrendt, M.B.: High-Redshift Star-Forming Galaxies. Ludwig-Maximilians-Universität München 2019.
- Bolmer, J.: Gamma-ray bursts and their host galaxies - cold gas and dust in the high-redshift interstellar medium. Technische Universität München 2019.
- Häuser, M.: Radial velocity measurements for white-dwarf/brown-dwarf binarie candidates and development of an active mirror control for the 11 m Hobby-Eberly-Telescope. Ludwig Maximilians Universität München 2019.
- Übler, H.D.N.: Galaxy Kinematics during the Peak Epoch of Cosmic Star Formation. Ludwig-Maximilians-Universität München 2019.
- Waisberg, I.R.: Optical interferometry of compact objects: testing general relativity and the extremes of accretion. Ludwig Maximilians Universität München 2019.

## Master Theses

- Pentaris, G.I.: Dark matter in dwarf elliptical galaxies. Ludwig-Maximilians-Universität München 2019.
- Steuer, J.: Wendelstein 1b+2b: Confirming transiting exoplanets with multiband photometry. Ludwig-Maximilians-Universität München 2019.

## Bachelor Theses

- Ehrhardt, J.: Wachstum von Spiralgalaxien. Ludwig-Maximilians-Universität München 2019.
- Freitag, C.: Alter und Sterentstehungsgeschichte passiver Galaxien. Ludwig-Maximilians-Universität München 2019.
- Goepl, C.: Die Entwicklung der MBH-MBulge Korrelation mit der Rotverschiebung. Ludwig-Maximilians-Universität München 2019.
- Haacke, L.: Die Messung des Rossiter-McLaughlin Effekts im Hinblick auf die Entwicklung extrasolarer Planetensysteme. Ludwig-Maximilians-Universität München 2019.
- Hecker, A.Y.: Eine unabhängige Massenabschätzung des stellaren Schwarzen Lochs in 1A 0620-00. Technische Universität München 2019.
- Koppelt, R.: Relativistische Kalpha Emission von Akkretionsscheiben: Eigenschaften ihrer zentralen Schwarzen Loecher. Ludwig-Maximilians-Universität München 2019.
- Langlechner, P.: Characterization of exoplanet atmospheres: Atmospheric models and results. Ludwig-Maximilians-Universität München 2019.
- Paetzold, S.C.: Multi-band transit photometry: the example of the hot Jupiters TrES-3b and TrES-5b. Ludwig-Maximilians-Universität München 2019.
- Pari, O.: Die Suche nach Exoplaneten mit der Radialgeschwindigkeitsmethode und Eigenschaften von Exoplaneten. Ludwig-Maximilians-Universität München 2019.
- Reiss, M.E.B.: Die IMF in elliptischen Galaxien: Forschung in den vergangenen zehn Jahren. Ludwig-Maximilians-Universität München 2019.
- Schmidt, M.: Eigenschaften eines Echelle-Spektrometers fuer die Radialgeschwindigkeitsmethode. Ludwig-Maximilians-Universität München 2019.
- Seebass, D.: Phasen der Panetenentstehung und deren Gasumgebung. Ludwig-Maximilians-Universität München 2019.
- Vogl, D.: Planeten um entwickelte Sterne. Ludwig-Maximilians-Universität München 2019.

## Collaborations / Transfer of Know-How

### Scientific Collaborations by Country



#### Australia

Astronomy Australia LTD (AAL): eROSITA follow up.  
 Australian National University, Canberra: Galaxienentstehung.  
 CSIRO Astronomy and Space Science, Epping: CAS-Observations, CAS-Theory.  
 Monash University, Melbourne: Nukleare Astrophysik.  
 Swinburne University of Technology, Victoria: Millisecond Pulsars.  
 University of Western Sydney: Magellanic Clouds.

#### Austria

Institut für Weltraumforschung, Graz: ATHENA WFI.  
 Universität und TU Wien: MICADO; ATHENA.  
 Universität Innsbruck: MICADO.  
 Universität Linz: MICADO.  
 RICAM Linz: MICADO

#### Belgium

CSL Liège, Katholieke Universiteit Leuven: INTEGRAL-Spectrometer SPI.

#### Brasil

IAG Universidad de Sao Paulo: PFS  
 Javalambre Physics of the Accelerating Universe Astrophysical Survey (J-PAS): eROSITA follow up.  
 Laboratorio Nacional de Astrofisica: PFS.  
 Universidad de Sao Paulo: Galaxienentstehung.  
 Observatorio Nacional, Rio de Janeiro: DES.  
 Centro Brasileiro de Pesquisas, Rio de Janeiro: DES.  
 Universidade Federal de Minas Gerais, Belo Horizonte: CAS-Observations.  
 Universidade Federal do Rio, Rio de Janeiro: DES.  
 Universidade Federal do Rio Grande do Sul: Nearby Active Galaxies.

**Canada**

NRC - Herzberg Astronomy and Astrophysics, Ottawa: CAS Observations.

Queen's University, Kingston: CAS-Observations.

University of Alberta, Edmonton: CAS-Observations.

University of Toronto, Toronto, Canada: CAS-Observations.

University of Victoria, Victoria: CAS-Observations.

University of Western Ontario, London: CAS-Observations; CAS-Theory.

**Chile**

ESO, Loint ALMA Observatory, Santiago: CAS-Observations; SBNF.

Universidad de Chile, Santiago de Chile: CAS-Observations.

Universidad de Concepcion: Röntgen-Doppelsternsysteme; CAS-Observations; Galaxienentwicklung.

Universidad Catolica Santiago: Röntgen-Doppelsternsysteme; Galaktisches Zentrum.

**China**

Donghua University, Shanghai: CAS-Theory.

Institute for High-Energy Physics (IHEP), Peking: Gammaquellen mit COMPTEL und INTEGRAL; Einstein Probe; eXTP.

Nanjing University, China: CAS-Observations.

National Astronomical Observatories of China, Beijing: PFS; CAS-Observations.

Kalvi Institute for Astronomy and Astrophysics at Peking University, Beijing: PFS.

Shanghai Jiao Tong University: PFS.

Tsinghua University: PFS

University of Hongkong: Strahlungsmechanismen von Pulsaren im Röntgen- und Gammabereich.

University of Science and Technology of China: PFS.

Xiamen University: PFS.

Xinjiang Astronomical Observatory, Urumqi: CAS-Theory.

**Czech Republic**

Charles University, Prague: SBNF; Hayabusa-2.

**Denmark**

Dänemarks Technische Universität: ATHENA.

**Finland**

University of Helsinki, Helsinki: CAS-Theory; CAS-Observations.

**France**

AAix-Marseille University, Marseille: CAS-Theory.

CEA, Saclay: INTEGRAL-Spektrometer SPI; EUCLID; SVOM; ATHENA.

Centre d'Etude Spatiale des Rayonnements (UPS), Toulouse: INTEGRAL-Spektrometer SPI; CAS-Observations.

IAP Paris: Nukleare Astrophysik.

IPAG Grenoble: GRAVITY; MICADO; CAS-Observations; CAS-Theory.

IRAM, Grenoble: CAS-Observations.

IRAM, Saint-Martin-d'Hères: CAS-Observations; Galaxienentstehung.

Laboratoire d'Astrophysique de Marseille (LAM): EUCLID; Gamma-Ray Bursts; PFS.

Laboratoire Univers et Particules de Montpellier, Montpellier: Cosmic-ray propagation in molecular clouds.

Observatoire de Paris (GEPI): MICADO; GRAVITY.

Observatoire de Paris (LERMA): CAS-Theory.

Observatoire de Paris (LESIA): MICADO; GRAVITY.

Observatoire de Paris-Meudon: GRAVITY, Galaktisches Zentrum.

SOLEIL Synchrotron (AILES beamline), Saint-Aubin: CAS-Laboratory.

Université de Bordeaux, Bordeaux: CAS-Theory.

Université de Cergy-Pontoise, Cergy Pontoise Cedex: CAS-Observations.

Université de Lille, Lille: CAS-Laboratory.

Université de Lyon, Lyon: CAS-Observations.

Université de Rennes, Rennes: CAS-Laboratory; CAS-Observations.

Université de Toulouse, Toulouse: CAS-Observations; CAS-Laboratory.

Université Paris Diderot, Paris: CAS-Observations.

Univ. Paris-Sud, Université Paris-Saclay: CAS-Laboratory.

**Germany**

Astrophysikalisches Institut Potsdam: eROSITA; XMM-Newton; OPTIMA; ARGOS; HETDEX; 4MOST.

Deutsches Elektronen-Synchrotron, Hamburg: CAS-Laboratory.

European Southern Observatory (ESO), Garching: GRAVITY; Galaxienentstehung; Nukleare Astrophysik; MICADO; ERIS; Black Hole Cam; Infrared Dark Clouds;

CAS-Observations; CAS-Theory.

Fraunhofer Institut für Integrierte Schaltungen, Erlangen: Mikroelektronikentwicklungen; ATHENA.

Heinrich-Heine-Universität, Düsseldorf: Soft Matter Physics.

Institut für Astronomie und Astrophysik Tübingen (IAAT): XMM-Newton; eROSITA; ATHENA; ESBO-DS.

Institut für Astrophysik Göttingen: MICADO.

Institut für Festkörperphysik und Werkstoff-Forschung, Dresden: Entwicklung weichmagnetischer Werkstoffe.

Institut für Materialphysik im Weltraum, Köln: Glasübergänge.

Landessternwarte Heidelberg-Königstuhl: Galaxienentstehung; ARGOS.

Laser Zentrum Hannover: Dichroics for ARGOS; Anti-Reflection Coating ERIS.

Ludwig-Maximilians-Universität, München: MICADO; HETDEX; eROSITA; CAS-Laboratory; CAS-Theory.

Max-Planck-Institut für Astronomie, Heidelberg: GRAVITY; PanSTARRS; SDSS; ARGOS; MICADO; EUCLID; CAS-Observations; CAS-Theory.

Max-Planck-Institut für Astrophysik, Garching: SDSS; OPTIMA; eROSITA; PFS.

Max-Planck-Institute of Biochemistry, Martinsried: CAS-Laboratory.

Max-Planck-Institut für Gravitationsphysik, Potsdam: Black Hole Cam.

Max-Planck-Institut für Physik, Werner Heisenberg Institut, München: MPI Halbleiterlabor; Athena.

Max-Planck-Institut für Radioastronomie, Bonn: ARGOS; Black Hole Cam; CAS-Observations; CAS-Theory.

Physikalisch-Technische Bundesanstalt Berlin: eROSITA.

Technische Universität Berlin: Interstellares Medium.

Technische Universität Darmstadt: CAST.

Technische Universität München: Nukleare Astrophysik; ESBO-DS.

Thüringer Landessternwarte Tautenburg: GROND; Gamma-Ray Bursts.

Universität Bonn: ATHENA; eROSITA; EUCLID; CAS Observations.

Universität der Bundeswehr, Munich: SBNF.

Universität Düsseldorf: ERC Advanced Grant; CAS-Theory.

Universität Erlangen (ECAP): eROSITA; ATHENA.

Universität Hamburg: eROSITA; OPTIMA (Flarestars).

Universität Heidelberg: ATHENA; XFEL; CAS-Theory.

Universität Jena: Isolierte Neutronensterne; Nukleare Astrophysik.

Universität Kassel, Kassel: CAS-Observations, CAS-Laboratory

Universität Köln: Galaktisches Zentrum; GRAVITY; CAS-Observations; CAS-Theory; CAS-Laboratory.

Universität Mannheim: ATHENA; XFEL.

Universität Stuttgart, Stuttgart: ESBO-DS.

Universität Würzburg: AGADE.

## Greece

University of Crete and Foundation for Research and Technology Hellas (FORTH), Heraklion: Röntgendoppelsternsysteme; OPTIMA Photometer; Röntgen-AGN.

National Observatory of Athens, Athens: Athena; eROSITA.

## Hungary

Konkoly Observatory of the Hungarian Academy of Sciences, Budapest: SBNF.

## India

Tata Institute of Fundamental Research, Mumbai: CAS-Observations.

## Iraq

University of AL-Muthanna, AL-Muthanna: CAS-Observations.

## Ireland

National University of Ireland, Galway: High Time Resolution Astronomy; CAS-Theory.

University College Dublin: Fermi/GBM.

## Israel

National University of Ireland, Galway: High Time Resolution Astronomy; CAS-Theory.

University College Dublin: Fermi/GBM.

## Italy

Brera Astronomical Observatory: Himmelsdurchmusterung Galaxienhaufen.

IFCAI-CNR Palermo: XMM-Newton Beobachtungen von Neutronensternen und Pulsaren.

INAF - Osservatorio Astrofisico di Catania, Catania: CAS-Laboratory.

INAF (Insituto Nazionale di Astrofisica): ATHENA, EUCLID.

INAF Arcetri, Florence: ARGOS; LBT; ERIS; CAS-Observations; CAS-Theory.

INAF Padua: LBT; MICADO; ERIS.

INAF Roma: LBT; Nukleare Astrophysik.

INAF Teramo: ERIS.

INAF Trieste: Gamma-Ray Bursts; Fermi/LAT.

INFN Frascati: SIDDHARTA.

Osservatorio Astrofisico di Catania: CAS-Theory; CAS-Laboratory.

Scuola Normale Superiore, Pisa: CAS-Observations.

Università Ca' Foscari Venezia, Venezia: CAS-Laboratory.

Università degli Studi di Firenze, Firenze: CAS-Observations.

University of Bologna: EUCLID; CAS-Laboratory; CAS-Observations.

Università di Perugia, Perugia: CAS-Observations.

Università degli Studi di Torino, Torino: CAS-Observations.

## Japan

Academia Sinica, Japan: PFS.

Kobe University, Kobe: CAS-Theory.

National Astronomical Observatory of Japan, Mitaka/Tokio: CAS-Theory; CAS-Observations; Galaxienentwicklung; PFS.

Institute of Physical and Chemical Research, Saitama: CAS-Observations.

Japan Aerospace Exploration Agency, Sagami-hara, Kanagawa: SBNAF.

Tokio Institute of Technology (TITECH), Ookayama: ASCA/XMM-Newton Beobachtungen von AGN.

University of Osaka: Astro-H.

University of Tokyo, Tokyo: PFS; CAS-Observations.

University of Tokyo, Institutes for Advanced Study (UTIAS): PFS

Tohoku University, Sendai: Galaxienentwicklung.

## Latvia

Ventspils University College, Ventspils: CAS-Theory.

## Mexico

Universidad Nacional Autonoma de México, Ensenada: CAS-Observations.

## Poland

Nicolaus Copernicus University, Torun: Pulsars Astrono-

mical Centers; ATHENA.

Space Research Center (CBK), Warschau: ATHENA WFI.

Astronomical Observatory Institute, Poznań: SBNAF.

University Zielona Gora: OPTIMA.

## Portugal

SIM Lissabon und Porto: GRAVITY.

Observatorio Astronomico de Lisboa, Lisbon: ATHENA.

## Russia

Baumann Moscow State Technical University, Moscow: Stark gekoppelte Systeme; Time-domain spectroscopy; CAS-Theory; CAS-Laboratory.

Institute of Astronomy, Moscow: CAS-Theory.

Lebedev Institute of Physics, Moscow: CAS-Theory.

Prokhorov General Physics Institute, Moscow: CAS-Laboratory.

Space Research Institute (IKI) of the Russian Academy of Science, Moscow: eROSITA/Spektrum Röntgen- Gamma.

Skobeltsyn Institute of Nuclear Physics, Moscow: Nukleare Astrophysik; Gamma-Ray Bursts; AGADE.

Ural Federal University, Jekaterinburg: CAS-Theory.

## Sweden

University Lund/Observatory: OPTIMA.

## Switzerland

CERN, Geneva: CAST.

ETH Zürich: ERIS.

Observatoire de Genève Sauverny, Geneva: ISDC/INTEGRAL; Nukleare Astrophysik; EUCLID.

Universität Basel: Nukleare Astrophysik.

University of Geneva: ATHENA.

University of Zurich: Infrared Dark Clouds.

## Spain

Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas, Madrid: DES.

Centro de Astrobiología, Madrid: CAS-Laboratory.

ESAC, Madrid: XMM-Newton Science Operations Center; INTEGRAL Science Operations Center; Herschel; Euclid; SBNAF.

Instituto de Astrofísica de Andalucía (IAA), Granada: SBNAF; ESBO-DS.

Instituto de Astrofísica de Canarias, La Laguna: SBNAF.

Instituto de Ciencias del Espacio, Bellaterra: DES.

Instituto de Ciències de l'Espai, Cerdanyola del Vallès: CAS-Observations.

Institut de Física d'Altes Energies, Barcelona: DES; EUCLID.

Javalambre Physics of the Accelerating Universe Astrophysical Survey (J-PAS): eROSITA follow up.

Universitat Autònoma de Barcelona, Bellaterra: CAS-Observations.

Universitat València, Department de Astronomia, València: INTEGRAL-Spektrometer SPI.

Universidad de Huelva, Huelva: CAS-Laboratory.

Universidad de Zaragoza: CAST.

Observatorio Astronomico de Mallorca: Novae; Kometen.

Observatorio Astronómico Nacional, Madrid: CAS-Observations.

### South Korea

Seoul National University, Seoul: Hayabusa-2.

### Taiwan

Academia Sinica Institute of Astronomy and Astrophysics (ASIAA), Taipei: CAS-Theory; CAS-Observations; PFS.

National Central University, Chungli; PanSTARRS.

### The Netherlands

ESTEC, Noordwijk: XMM-Newton; INTEGRAL; EUCLID; ATHENA; eROSITA.

JIVE Dwingeloo: Black Hole Cam.

NOVA (Leiden, Groningen, ASTRON/Dwingeloo, Amsterdam): MICADO; ERIS.

Leiden University, Leiden: CAS-Observations; CAS-Theory; IR/Submm Spectroscopy.

Radboud University, Nijmegen: Black Hole Cam; CAS-Laboratory.

SRON, Utrecht: Chandra-LETG.

University of Groningen, Kapteyn Institute: Rekonstruktion der Dichteverteilung im Universum; EUCLID; Dynamical-Chemical Models; CAS-Theory; CAS-Observations.

### UK

John Moores University, Liverpool: Himmelsdurchmusterung Galaxienhaufen; Infrared Dark Clouds; CAS-Observations.

Open University, Milton Keynes: Kataklysmische Variablen; Novae; ATHENA.

Queen's University, Belfast: PanSTARRS.

Queen Mary University of London, London, UK: CAS-Observations.

Rutherford Appleton Laboratory, Council for the Central Laboratory of the Research Councils, Swindon: SIS-Junctions.

SKA Organisation, Jodrell Bank Observatory, Macclesfield: CAS-Observations.

United Kingdom Astronomy Technology Centre (UKATC): EUCLID; ERIS.

University of Cambridge: DES.

University College London, London: High Energy Pulsars; EUCLID; DES; CAS-Observations.

University of Durham: PanSTARRS.

University of Edinburgh: DES; PanSTARRS.

University of Leeds, Leeds: CAS-Theory.

University of Leicester: XMM-Newton; ATHENA; Swift.

University of Nottingham: DES.

University of Portsmouth: DES.

University of Sussex, Brighton: DES.

University of Southampton: Magellanic Clouds.

### USA

Argonne National Laboratory: DES.

Brookhaven National Laboratory: strahlenharte JFET-Elektronik; strahlenharte Detektoren.

California Inst. of Technology, Pasadena: X-ray Survey; PFS.

CfA, Cambridge: ATHENA/WFI; XMM-Newton/Chandra Kalibration.

Clemson University: Gamma-Ray Bursts; Nukleare Astrophysik.

Fermilab, Batavia: DES.

Harvard University: PanSTARRS.

Harvard-Smithsonian Center for Astrophysics, Cambridge: CAS-Observations; CAS-Laboratory; CAS-Theory.

Institute for Astronomy, Hawaii, Honolulu: Galaxienentstehung; PanSTARRS; NIR Kamera für Wendelstein.

Jet Propulsion Laboratory, Pasadena: EUCLID; CAS-Observations.

Johns Hopkins University: PanSTARRS; PFS.

Kavli Institute for the Physics and Mathematics of the Universe: PFS

Marshall Space Flight Center, Huntsville: Fermi Gamma-Ray Burst Monitor; XMM-Newton und Chandra Beobachtungen von Neutronensternen, Pulsaren und Supernova-Überresten.

MIT, Cambridge: ATHENA WFI.

NASA/Ames Research Center, Mofett Field (CA): MHD Shocks; SBNAF.

NASA/Goddard Space Flight Center, Greenbelt (MD): INTEGRAL-Spektrometer SPI; Swift.

NASA/Jet Propulsion Laboratory, Pasadena: PFS; CAS-Observations.

National Radio Astronomy Observatory, Charlottesville: CAS-Theory; CAS-Observations.

National Radio Astronomy Observatory, Socorro, New Mexico: CAS-Observations.

National Science Foundation, Arlington: CAS-Observations.

NOAO, Tucson: DES.

Ohio State University, Columbus: DES; LBT.

Pacific Northwest National Laboratory (PNNL), Richland: CAST.

Pennsylvania State University: HETDEX; Swift; ATHENA.

Princeton University: PFS; CAS-Theory.

Research Corporation, Tucson: LBT.

San Jose State University: MHD shocks.

SLAC, Stanford: CAMP; DES; ATHENA.

Smithsonian Astrophysical Observatory, Cambridge: Chandra-LETGS; PanSTARRS; Röntgendoppelsterne in M31; Athena.

Space Telescope Science Institute, Baltimore: Galaxienentstehung; PanSTARRS; Turbulence; SBNAF.

Stanford University: DES; Fermi/LAT; Fermi/GBM.

Texas A & M University, College Station: DES; SBNAF.

Texas State University, San Marcos: HETDEX.

University of Arizona, Tucson: Kosmische Strahlung; Planetenentstehung; LBT; ARGOS; CAS-Observations.

University of California, Berkeley: MPG/UCB-Kollaboration; FAST; INTEGRAL-Spektrometer SPI; Superbubbles.

University of California, Santa Cruz: DES.

University of Chicago, Chicago: CAS-Observations; DES.

University of Colorado, Boulder (Co): Superbubbles; CAS-Observations.

University of Florida, Gainesville: Infrared Dark Clouds.

University of Hawaii, Honolulu, Hawaii: CAS-Theory.

University of Illinois at Urbana-Champaign: DES.

University of Massachusetts, Amherst: CAS-Observations.

University of Michigan, Ann Arbor: DES.

University of Pennsylvania: DES.

University of Pittsburgh: Galaxienentstehung.

University of Texas, Austin: Galaxienentstehung; HETDEX.

University of Texas, San Antonio: SBNAF.

University of Toledo: Galaxienentstehung; CAS-Observations.

University of Virginia, Charlottesville: CAS-Theory.

Yale University, New Haven: CAS-Observations.

## Multinational Collaborations - Projects

ARGOS - Laserleitstern für das LBT: Arcetri Observatory, Italy; AIP, LSW Heidelberg, MPIa, MPIfR, Germany; University of Arizona, USA.

ASPI - The International Wave Consortium: CNR-IFSI Frascati, Italy; LPCE/CNRS Orleans, France; Dept. of Automatic Control and Systems University of Sheffield, UK.

ATHENA - Advanced Telescope for High Energy Astrophysics: Dänemarks Technische Universität, Dänemark; Nikolaus Kopernikus Astronomical Center, Polen; Universität Wien, Österreich; IWF, Graz; INAF Italy, Italy; CEA Frankreich, Frankreich; University of Leicester, Open University, UK; Institut für Astronomie und Astrophysik Tübingen, Erlangen Centre for Astroparticle Physics (ECAP), Germany; ESA; NOA, Greece; Universität Geneva, Schweiz; Institute for Astrophysics, Portugal.

BOSS - Baryon Oscillation Spectroscopic Survey: SDSS-IV Collaboration.

Chandra: Marshall Space Flight Center Huntsville, Massachusetts Institute of Technology Cambridge, Smithsonian Astrophysical Observatory Cambridge, USA; Space Research Institute Utrecht, The Netherlands; Universität Hamburg, Germany.

COSMOS - Cosmological Evolution Survey: INAF-Osservatorio Astronomico di Bologna, INAF-Osservatorio Astronomico di Roma, INAF-Osservatorio Astrofisico di Arcetri, INAF/IASF-CNR, Sezione di Milano, IRA-INAf, Bologna, Dipartimento di Astronomia, Università Padova, Dipartimento di Fisica, Università degli Studi Roma Tre, Italy; Harvard-Smithsonian Centre for Astrophysics, Cambridge, Dept. of Physics, Carnegie Mellon University, Pittsburg, Institute for Astronomy, University of Hawaii, California Institute of Technology, Pasadena, Dept. of Astronomy, Yale University, USA; INTEGRAL Science Data Centre, Versoix, Switzerland; Laboratoire d'Astrophysique de Marseille, France.

DES - Dark Energy Survey: LMU München, Excellence Cluster Universe, Germany; The Fermi National Accelerator Laboratory (Fermilab), University of Chicago, NOAO, University of Michigan, University of Pennsylvania, University of Illinois at Urbana-Champaign, Ohio State University, Texas A&M University, University of California Santa Cruz, Stanford University, SLAC National Accelerator Laboratory, The Lawrence Berkeley National Laboratory, Argonne National Laboratory, USA; University College London, University of Cambridge, University of Edinburgh, University of Portsmouth, University of Sussex, University of Nottingham, UK; Observatorio Nacional, Centro Brasileiro das Pesquisas Físicas, Universidade Federal do Rio, Brasilien; Instituto de Ciencias del Espacio, Institut de Física d'Altes Energies, Centro de Investigaciones Energéticas Medioambientales y Tecnológicas, Spain.

eBOSS - SDSS-IV Extended Baryon Oscillation Spectroscopic Survey: Carnegie Mellon University (CMU), University of Colorado Boulder, Harvard-Smithsonian Center for Astrophysics Participation Group, Johns Hopkins Uni-

versity, Kalvi Institute for the Physics and Mathematics of the Universe, New Mexico State University, New York University, The Ohio State University, Penn State University, University of Utah, University of Wisconsin, Yale University, USA; Max-Planck-Institut fuer Astrophysik (MPA Garching), Max-Planck-Institut für extraterrestrische Physik (MPE), Max-Planck-Institut für Astronomie (MPIA Heidelberg), Germany; National Astronomical Observatories of China, Shanghai Astronomical Observatory, China; United Kingdom Participation Group, University of Portsmouth, UK.

ERIS - Enhanced Resolution Imager and Spectrograph for the VLT: ESO, Germany; ETH Zürich, Switzerland; INAF Arcetri (with OAA, OATe and OAPd), Italy; UKATC Edinburgh, Scotland; NOVA Leiden, The Netherlands.

eROSITA - extended Roentgen Survey with an Imaging Telescope Array: AIP Potsdam, Universität Tübingen, Universität Bonn, Universität Erlangen, Universität Hamburg, Remeis-Sternwarte Bamberg, MPA Garching, LMU (USM) München, Germany; IKI Moskau, Russia.

ESBO-DS - European Stratospheric Balloon Observatory – Design Study, EU H2020 project; University of Stuttgart, University of Tübingen, Germany; Swedish Space Corporation, Sweden; Instituto de Astrofísica de Andalucía, Spain.

EUCLID - ESA Mission to map the Dark Energy: ESA; CEA Saclay, LAM, France; University Bologna, INAF, Italy; MSSL, Durham University, UKATC UK; STScI, USA; MPIA Heidelberg, Universität Bonn, Germany.

Fermi/GBM - Fermi Gamma-Ray Burst Monitor: Marshall Space Flight Center Huntsville, University of Huntsville, USA.

Fermi/LAT - Fermi Gamma-Ray Large Area Space Telescope: Stanford University Palo Alto, Naval Research Laboratory Washington DC, Sonoma State University Rohnert Park, Lockheed Martin Corporation Palo Alto, University of California Santa Cruz, University of Chicago, University of Maryland Greenbelt, NASA Ames Research Center Moffett Field, NASA Goddard Space Flight Center for High Energy Astrophysics Greenbelt, Boston University, University of Utah Salt Lake City, University of Washington Seattle, SLAC Particle Astrophysics Group Palo Alto, USA; ICTP and INFN Trieste, Istituto Nazionale di Fisica Nucleare Trieste, Italy; University of Tokyo, Japan; CEA Saclay, France.

GRAVITY - Instrument for VLT Interferometry: MPIA Heidelberg, Universität Köln, ESO Garching, Germany; SIM Lissabon und Porto, Portugal; IPAG, Grenoble, Observatoire de Paris / Meudon (LESIA), France.

HETDEX - Hobby-Eberly Telescope Dark Energy Experiment: University of Texas, Austin, Pennsylvania State University, Texas A&M University, USA; AIP Potsdam, LMU, USM, Germany.

INTAS - Cooperation of Western and Eastern European Scientists: France, Germany, Norway, Russia.



ISDC - INTEGRAL Science Data Centre: Observatoire de Geneva Sauverny, Switzerland; Service d'Astrophysique Centre d'Etudes de Saclay, France; Rutherford Appleton Laboratory Oxon Dept. of Physics University Southampton, UK; Institut für Astronomie und Astrophysik Tübingen Germany; Danish Space Research Institute Lyngby, Denmark; University College Dublin, Ireland; Istituto di Fisica Milano, Istituto di Astrofisica Spaziale Frascati, Italy; N. Copernicus Astronomical Center Warsaw, Poland; Space Research Institute of the Russian Academy of Sciences Moscow, Russia; Laboratory for High Energy Astrophysics GSFC Greenbelt, USA.

INTEGRAL-Spectrometer SPI: Centre d'Etude Spatiale des Rayonnements (CESR) Toulouse, CEA Saclay Gif-sur-Yvette, France; University de Valencia Burjassot, Spain.

LBT - Large Binocular Telescope Project: MPIA Heidelberg, MPIfR Bonn, Landessternwarte Heidelberg Königstuhl, AIP, Germany; University of Arizona, Tucson, Ohio State University, Columbus, Research Corporation, USA; INAF, Italy.

MICADO - Multi-Adaptive Optics Imaging Camera for Deep Observations: ESO, LMU (USM), MPIA Heidelberg, IAG Göttingen, Germany; INAF-OAPD Padova, Italy; A\* (an Austrian partnership comprising the University of Vienna, the University of Innsbruck, the University of Graz, and the University of Linz [with RICAM Linz]; specific contributions to MICADO come from Vienna/Innsbruck/Linz), Austria; NOVA (a federation several astronomical institutes; specific contributions to MICADO come from the University of Groningen, the University of Leiden, and the NOVA optical/infrared instrumentation group based at ASTRON in Dwingeloo), The Netherlands; CNRS/INSU (representing LESIA, GEPI and IPAG), Paris, France.

MXT - Microchannel X-Ray Telescope for Gamma-Ray Bursts: CEA, Saclay, France; University of Leicester, UK.

OPTIMA: AIP, MPI für Astrophysik, Universität Hamburg, Germany; University of Crete, Greece; University Zielona Gora, Poland; University Lund/Observatory, Schweden.

PanSTARRS - Panoramic Survey Telescope & Rapid Response System: MPIA Heidelberg, Germany, University of Hawaii, Harvard University, Johns Hopkins Univ. Baltimore, MD, USA; Universities of Durham, Edinburgh, Belfast, UK.

PFS - The Subaru Prime Focus Spectrograph Collaboration: Kavli Institute for the Physics and Mathematics of the Universe, California Institute of Technology, NASA Jet Propulsion Laboratory, Princeton University, Johns Hopkins University, USA; The University of Tokyo Institutes for Advanced Study (UTIAS), University of Tokyo, National Astronomical Observatory of Japan, Academia Sinica, Japan; Institute of Astronomy and Astrophysics (ASIAA), Taiwan; Laboratoire d'Astrophysique de Marseille, France; Brazilian Consortium: IAG Universidad de Sao Paulo, Laboratorio Nacional de Astrofisica, Brazil; Max-Planck Society, Max-Planck-Institut für Astrophysik (MPA, Garching), Max-Planck-Institut für extraterrestrische Physik (MPE), Germany; Chinese Consortium: Shanghai Jiao Tong University, National Astronomical Observatories of China, Tsinghua University, The University of Science and Technology of China, Xiamen University, Peking University, China.

SBNAF - Small Bodies Near and Far, EU H2020 project; Poznań, Poland; Instituto de Astrofísica de Andalucía, Granada, Instituto de Astrofísica de Canarias (IAC), Spain; Konkoly Observatory, Budapest, Hungary; Institute of Space and Astronautical Science (ISAS, JAXA), Kanagawa, Japan.

SDSS - Sloan Digital Sky Survey: MPA Garching, MPIA Heidelberg, Germany; Univ. of Washington, Seattle, Fermi National Accelerator Laboratory, Batavia, University of Michigan, Ann Arbor, Carnegie Mellon University, Pittsburgh, Penn State University, University Park, Princeton University Observatory, Princeton, Institute of Advanced Study Princeton, Space Telescope Science Institute, Baltimore, Johns Hopkins Univ. Baltimore, USA.

Swift - Gamma-Ray Burst Mission: NASA/GSFC Greenbelt, Penn State University, USA; University of Leicester, Mullard Space Science Laboratory London, UK; Osservatorio Astronomico Brera, Italy.

XMM-Newton/SSC (Survey Science Center): AIP, Germany; SAP Saclay, CDS Strasbourg, CESR Toulouse, France; University of Leicester, Institute of Astronomy Cambridge, MSSL London, UK.

XMM-Newton/EPIC (European Photo Imaging Camera): SAP Saclay, IAS Orsay, CESR Toulouse, France; University of Leicester, University Birmingham, UK; CNR Mailand-Palermo-Bologna-Frascati, Osservatorio Astronomico Mailand, Italy; Institut für Astronomie und Astrophysik Tübingen, Germany.

## Industrial Collaborations

3d shape GmbH, Erlangen: Metrology for slumped glass mirror study.

4D Engineering, Gilching, Germany: Software development for GRAVITY.

ABN GmbH, Neuried: Ongoing servicing of the MPE test facility PANTER.

Absolut-System, Seyssinet-Pariset, France: 40K cooling system MICADO.

AC Tech GmbH, Freiberg: ERIS Konus.

ACM GmbH, Naumburg - Acktar Ltd., Kiryat-Gat, Israel: Schwärzen für EUCLID und ERIS.

af inventions, Braunschweig: FPGA Programmierung für eROSITA.

Airbus Defense and Space, Munich: EUCLID design study, eROSITA.

Array Electronics, Egming: DAQ development OPTIMA.

Bach Research, Boulder, USA: High resolution grating for ERIS.

BASF Coatings AG, Münster: Investigations on the scattering properties of micro particles.

Bräuninger & Konstruktionen, Neuried: Construction and manufacturing of laboratory equipment.

BRUNSON - VMT GmbH, Bruchsal: Optische Geräte und Zubehör.

Buchberger GmbH, Tuchenbach: Manufacturing of parts for PANTER manipulators, ERIS telescope flange.

CANON Inc., Tochigi-Ken, Japan: Grism development for GRAVITY.

Christian Rehm - ISKON, Isen: Design and mechanical engineering for MICADO.

CryoVac GmbH, Troisdorf: MICADO Cryosat Study; ERIS SPIFFY Upgrade.

Dico-Solutions, München: eROSITA Betrieb.

ECM Engineered Ceramic Materials GmbH, Moosinning: Hersteller von CESIC.

EATON Powering Business Worldwide, Camarillo, CA, USA: Actuators separation-nuts for eROSITA.

ESL GmbH, Berlin: Manufacturing of circuit boards.

Fraunhofer IOF, Jena: Mirror development for MICADO.

Freyer GmbH, Tuningen: PANTER.

GEWO Feinmechanik GmbH, Wörth/Hörlkofen: Mechanische Fertigung, ERIS.

Gräfe Spezialoptik GmbH, Camburg: Zerodur-Materialbearbeitung und -Lieferant..

Hans Englert GmbH, Berlin: Manufacturing of front panels and metering devices.

Hochschule München, Laserlabor, Prof. Heinz Huber, München: Materialbearbeitung mit Ultrakurzpulsaraser.

Hyprostatik, Göppingen: MICADO Hydroststik.

Industrieberatung Reinhard Katterloher, München: Specifications for MICADO Test Cryostat.

Ingenieurbüro Josef Eder, Hilgertshausen: System engineering for eROSITA, ATHENA, ERIS, Einstein Probe.

Ingenieurbüro Weisz, München: Design and mechanical engineering for ERIS and MICADO.

IRIDIAN Spectral Technologies, Ottawa, Ontario, Canada: ERIS Filters.

ISKON, Isen: Mechanical construction for MICADO.

Kampf Telescope Optics (KTO), München: Design & System Engineering for MICADO.

KAON GmbH, München: Consulting for cryogenic systems for MICADO.

KASAG Swiss, Langnau, Schweiz: MICADO feasibility study.

Korth Kristalle GmbH, Kiel: Lenses for ERIS Spectrometer.

Kinkele GmbH & Co. KG, Ochsenfurt: ERIS Struktur.

LT Ultra, Herdwangen-Schönach: Spiegelhersteller.

Medway Optics Ltd, Rainham, Kent, UK: Optical coatings for ERIS.

M-Industrieverpackung GmbH, Sulzemoos: ERIS Transportcontainer.

OHB System AG, München: EUCLID design study.

Peter Feckl Maschinenbau GmbH, Forstern: Mechanische Fertigung, ERIS.

Sacher Lasertechnik, Marburg: Metrology Laser for GRAVITY.

Safran Reosc, Saint-Pierre-du-Perray, France: Mirror development MICADO.

## Activities in Transfer of Know-How

The high number of cooperations with industry and other research groups leads to a natural transfer of scientific and technical know-how, especially if orders are given to the industry. In contrast, we list in the following those cooperations which are financed by the industry as well as patents and licenses.

### A) Licenses

Baader Planetarium GmbH, Mammendorf: Reflexionsgitter Spectrograph für Lehrzwecke.

Baader Planetarium GmbH, Mammendorf: Baches Echelle Spectrograph.

### B) Cooperations with Universities (by Contract)

Detector Development:

Universität Mannheim, ASIC Entwicklung.

Politecnico di Milano, Analog-Elektronik Entwicklung.

University Stanford, Analog-Elektronik Entwicklung.

### C) Patents - Activities in 2019

The MPE held a total of 10 patents by the end of 2019.