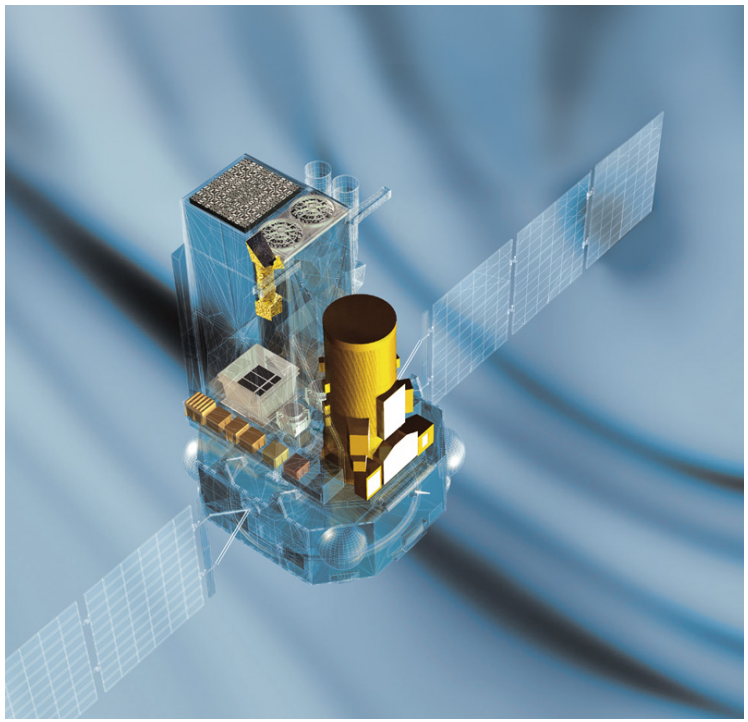


Gamma-ray lines from ^{44}Ti sources:

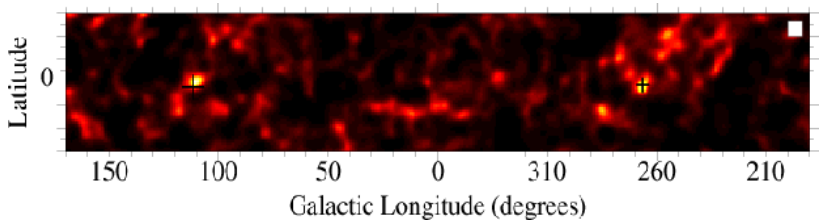
INTEGRAL

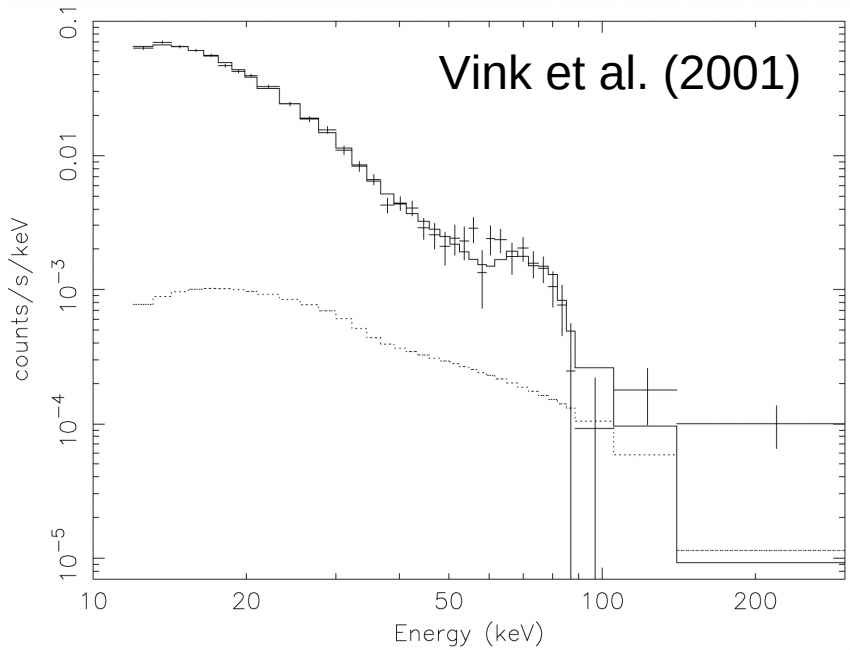
From COMPTEL to INTEGRAL

- COMPTEL's Legacy: 1157 keV Emission
  - Cassiopeia A
  - Vela Junior SNR
- BeppoSAX: Detection of the low energy lines in Cas A
  - Combined flux: $(2.5\pm10)\times10^{-5}$ ph cm^{-2} s^{-1}
  - Dependent on continuum!

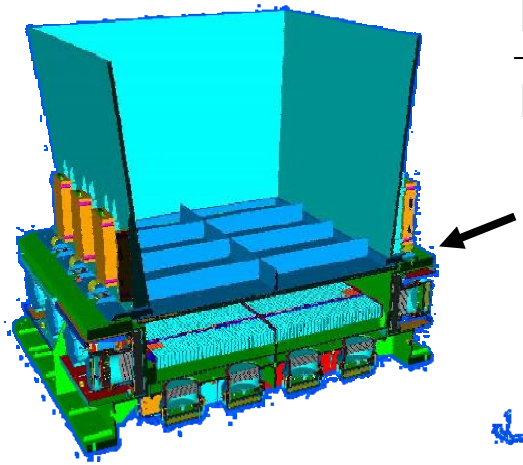
- *Confirmation of previous results?*
- *Location and dynamics of ^{44}Ti in Cas A?*
- *Can we detect other SNRs?*

Iyudin et al. (1999)



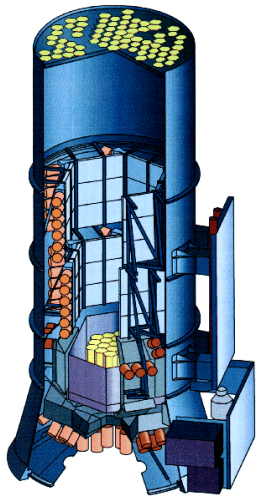


Gamma-ray Detectors onboard the INTEGRAL



Imager

IBIS/ISGRI



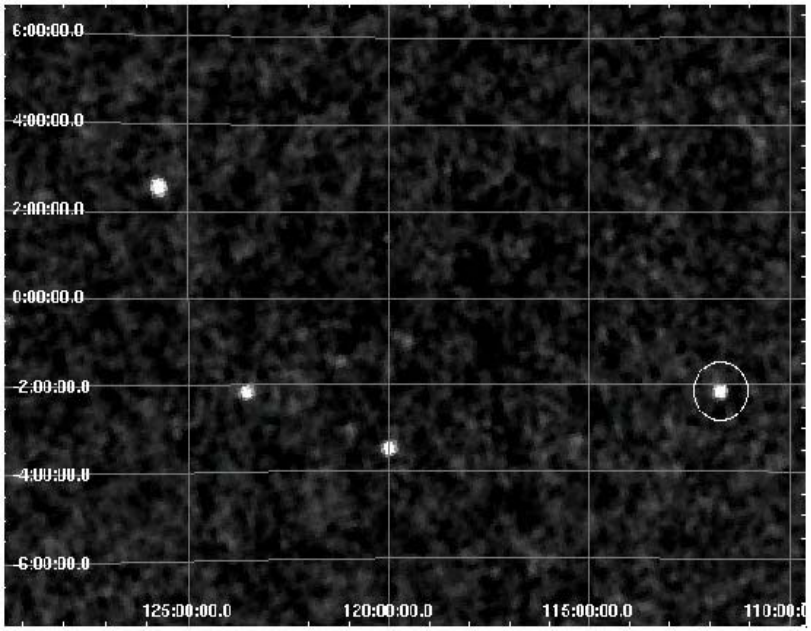
Spectrometer

SPI

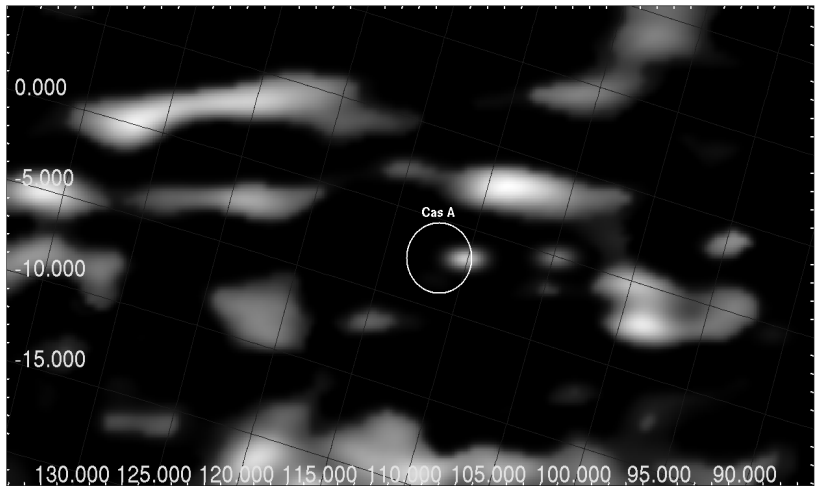
- FoV 30°x30°
- Coded Mask

	IBIS/ISGRI	SPI
Detectors	128 x 128 Cd-Te	19 Ge (80 K)
Angular Resolution	12’	2°
Energy Range	15 keV – 10 MeV	20 keV – 8 MeV
Energy Resolution	10% @ 1 MeV	400 @ 1 MeV

^{44}Ti from INTEGRAL



IBIS Image (20-50 keV)

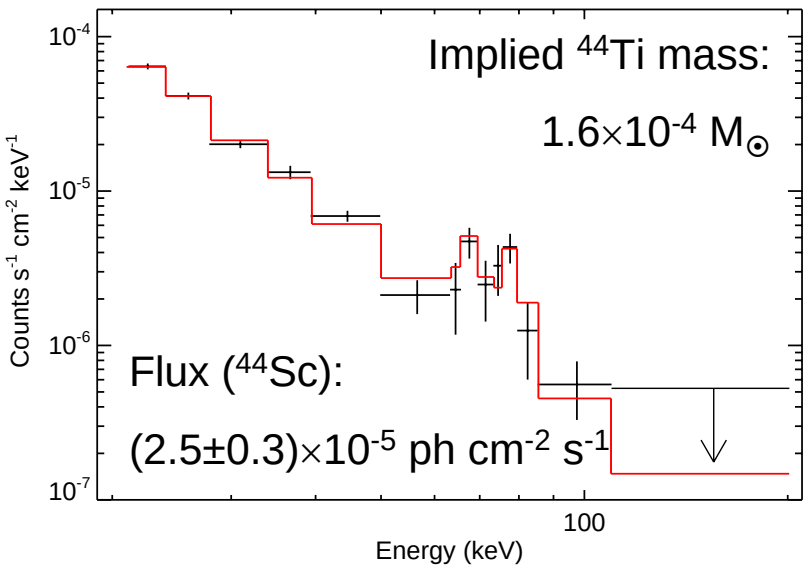


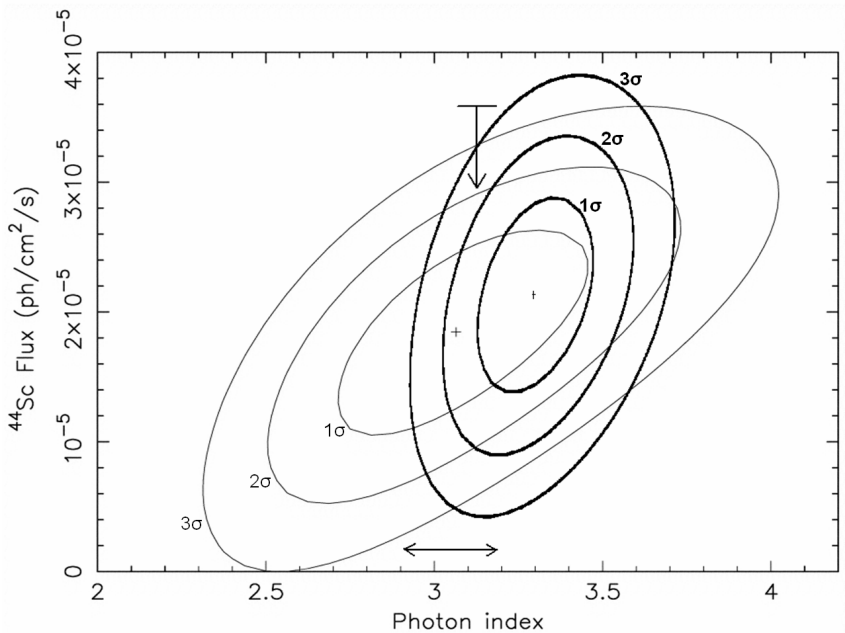
Vink (2005)

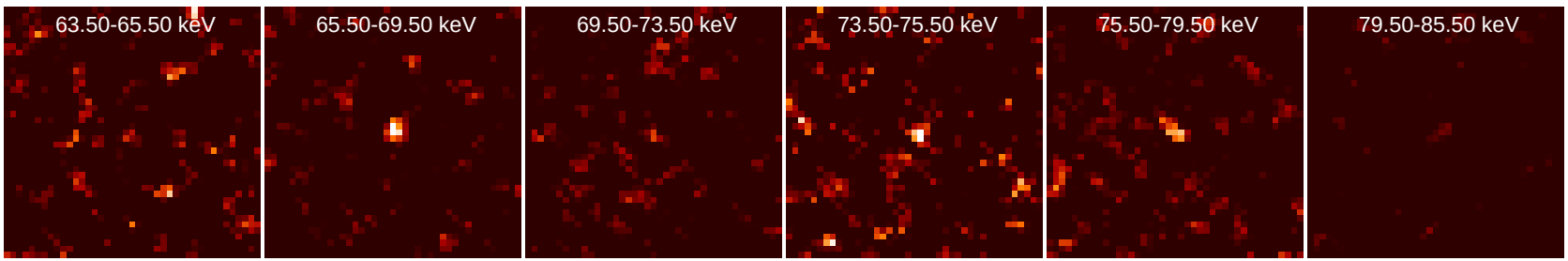
SPI Image (1142-1172 keV)

IBIS/ISGRI Observations of Cas A

Renaud et al. (2006)

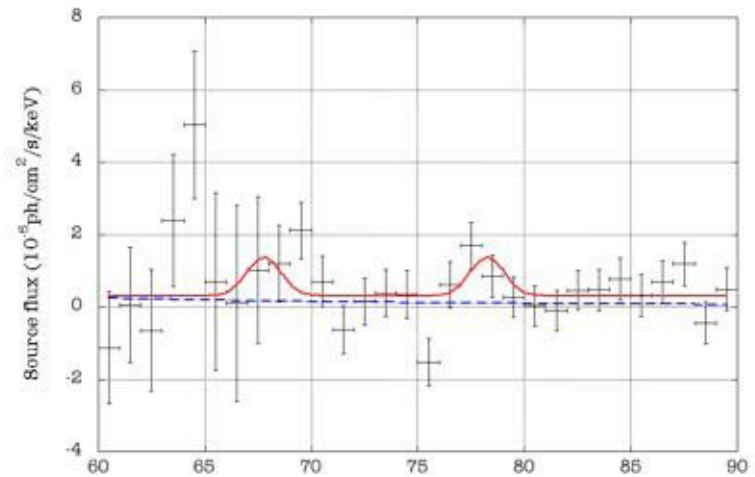


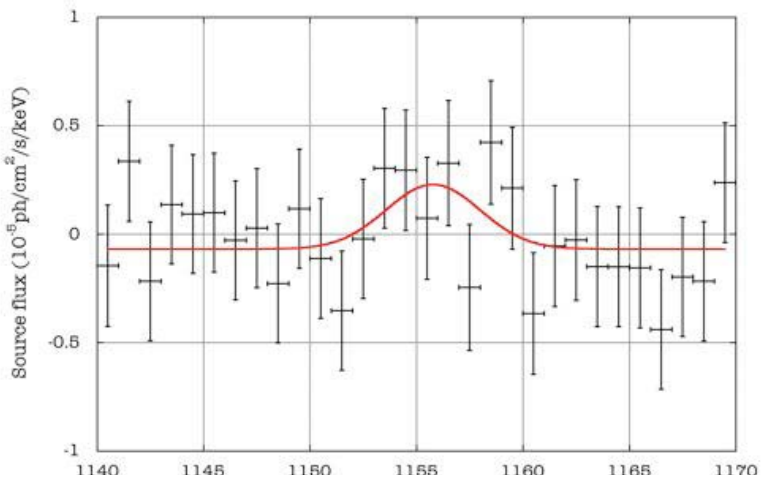


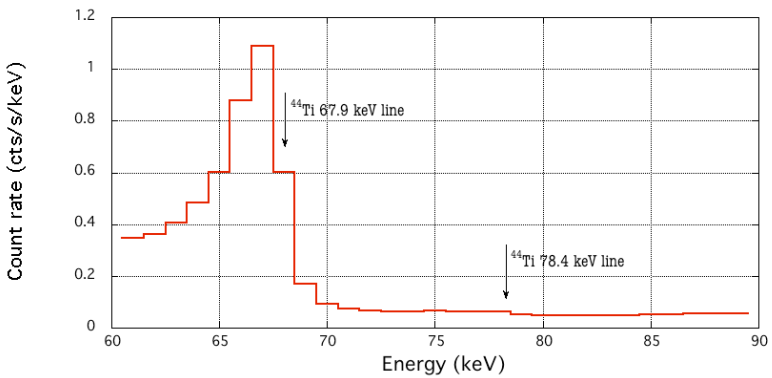


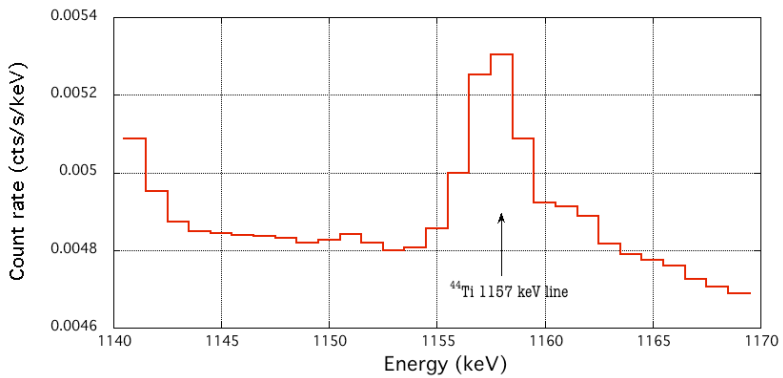
^{44}Ti as seen with SPI

Martin (2008, PhD)



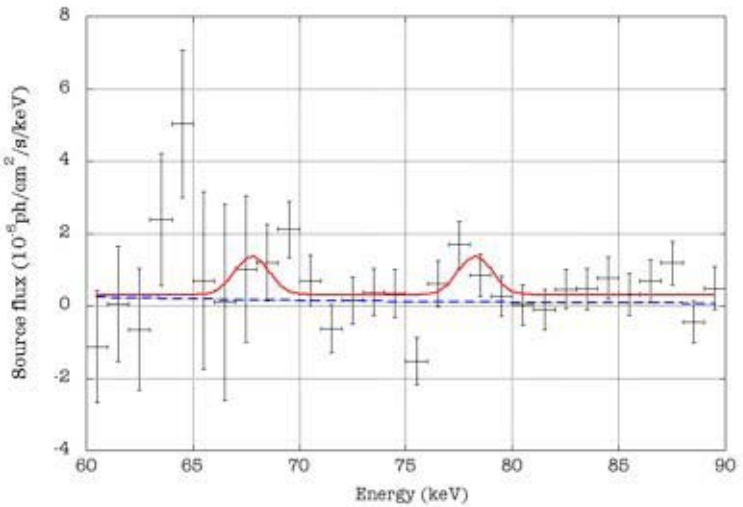


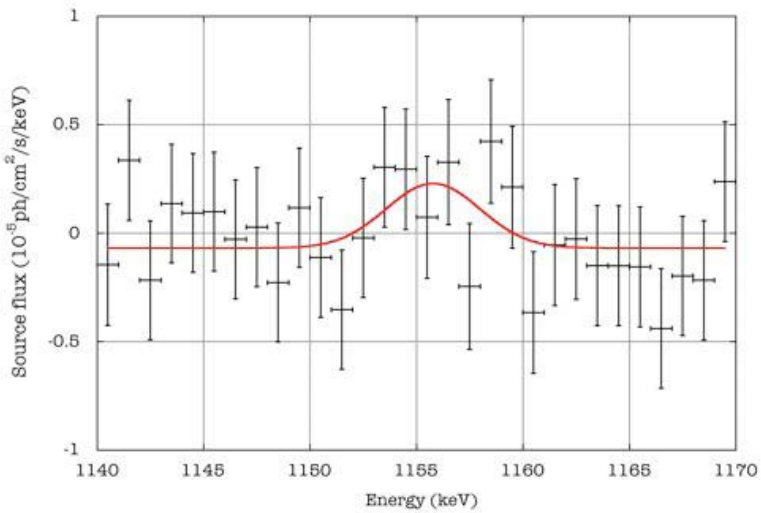




^{44}Ti as seen with SPI

Martin (2008, PhD)



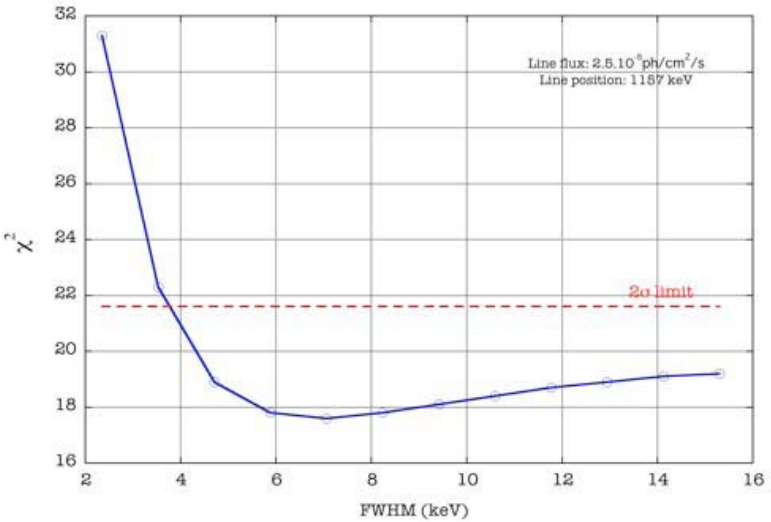


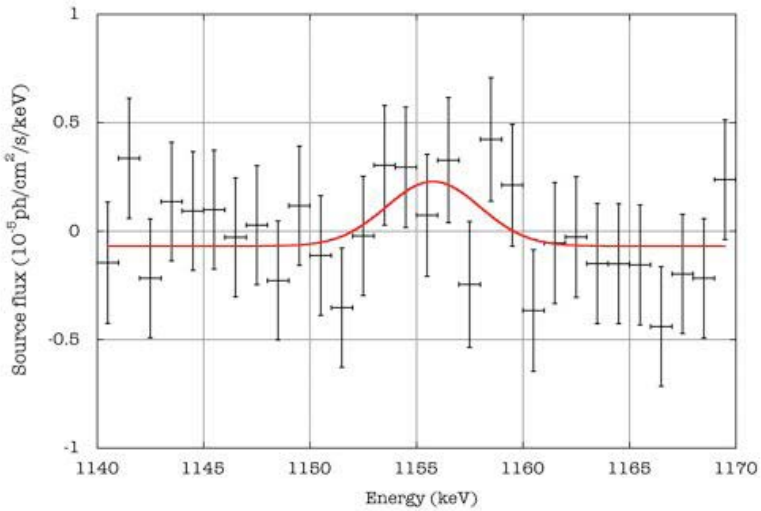
Derived spectral properties:

- Flux: (2.4 ± 1.6)x10^{-5} ph cm^{-2} s^{-1}
- Redshift: (0.8 ± 0.5) keV

^{44}Ti as seen with SPI

Martin (2008, PhD)

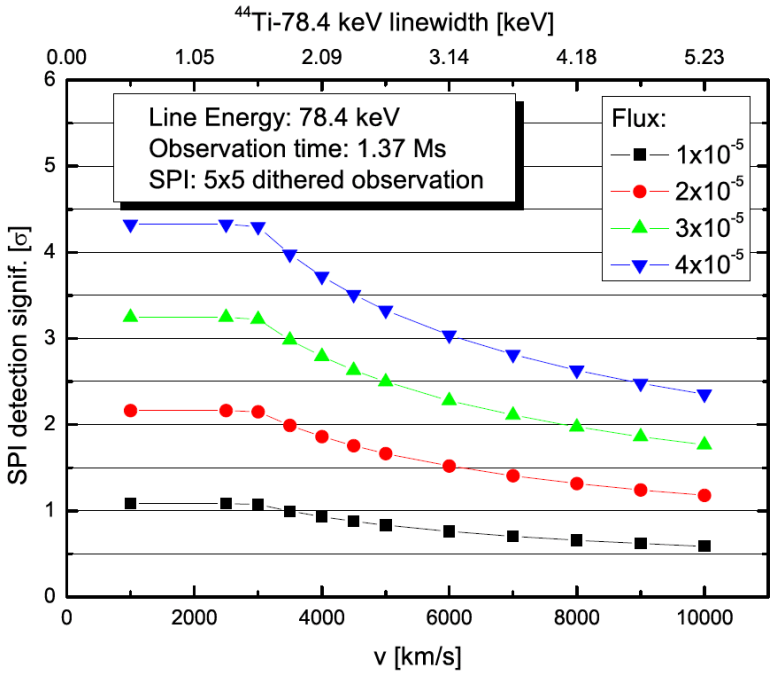




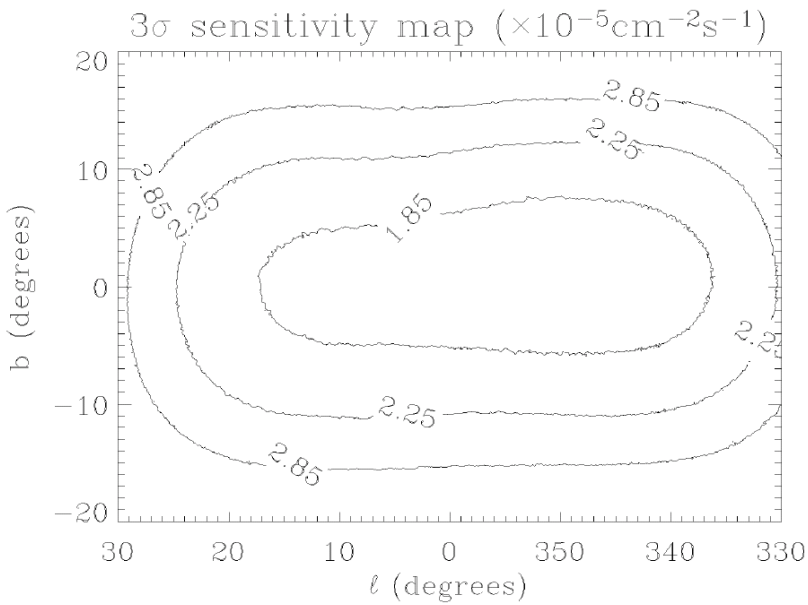
Derived lower limit on ^{44}Ti expansion velocity: 500 km s^{-1}

Vela Junior and Tycho

Von Kienlin (2004)



Renaud (2004)



Renaud (IBIS/ISGRI, low E lines, 2004/2006)

- Tycho: < 1.5 × 10^{-5} ph cm^{-2} s^{-1}
- Vela Jr: < 10^{-5} ph cm^{-2} s^{-1}

Kepler: < 1.09 × 10^{-5} ph cm^{-2} s^{-1}

Summary

- Cas A most reliable ^{44}Ti emission source
- Low detection level
- Lower limit on expansion velocity is 500 km s^{-1}
- No other ^{44}Ti source detected with INTEGRAL