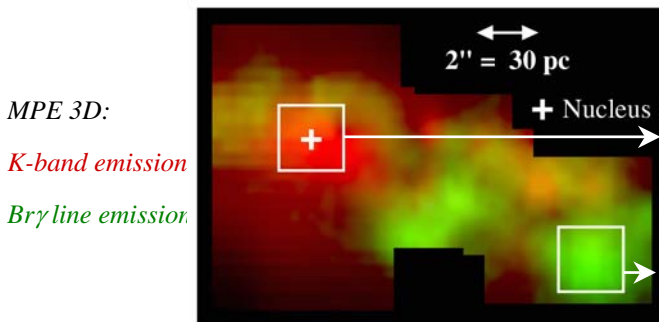


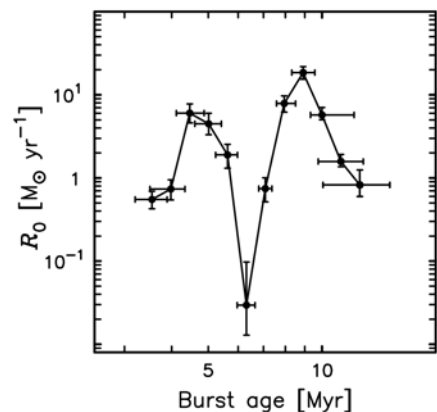
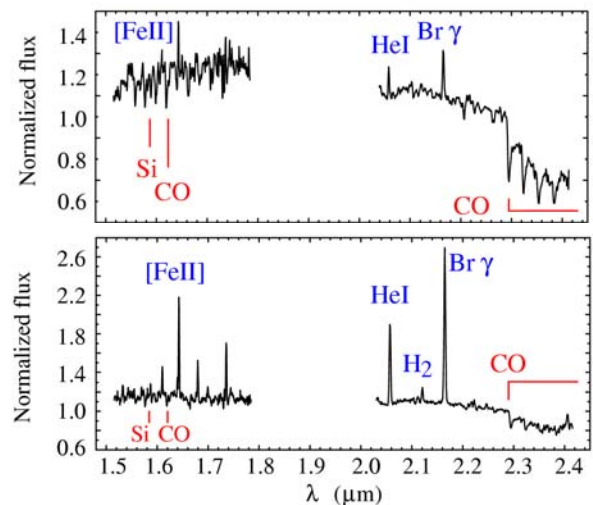
Starburst galaxies are important constituents of the universe at all accessible redshifts. However, a detailed and quantitative understanding of the starburst phenomenon is still lacking. Progress has been hindered by the scarcity of spatially resolved data and by dust obscuration often hampering high-resolution studies in the optical/UV. In this context, we carried out a detailed investigation of the nearby (3.3 Mpc) archetypal starburst galaxy M82. We used mainly near-IR integral field spectroscopy from the MPE 3D instrument and mid-IR spectroscopy from the ISO SWS, covering the central actively star-forming regions.

We derived a typical duration for individual burst sites of $\sim 10^6$ yr. The data are consistent with the formation of very massive stars ($\geq 50\text{--}100 M_{\odot}$) and require a flattening of the IMF below a few M_{\odot} assuming a Salpeter slope at higher masses. The global starburst activity in M82 occurred in two successive episodes each lasting a few 10^6 yr, peaking ≈ 10 and 5×10^6 yr ago. The first episode took place throughout the central regions and was particularly intense at the nucleus while the second episode occurred predominantly in a circumnuclear ring and along the stellar bar. This sequence likely resulted from the gravitational interaction between M82 and its neighbour M81, and subsequent bar-driven evolution. The short burst duration on all spatial scales indicates strong negative feedback effects due to the collective mechanical energy released by massive stars, rapidly inhibiting star formation after the onset of each starburst episode.



Composite map and representative spectra of the nuclear starburst regions of M82 from MPE 3D. The *K*-band continuum emission and the absorption features trace evolved red (super)giants while H (e.g. Br γ) and He recombination lines trace HII regions around young OB stars. The relative spatial distributions in strength of these features indicate important variations on scales \sim few tens of pc in the evolutionary stage of the starburst.

Global star formation history of the central regions of M82, reconstructed from the modeling of all individual pixels within the MPE 3D field of view. Two distinct starburst episodes are outlined, peaking ≈ 10 and 5 Myr ago and lasting each a few Myr only.



References:

- Förster Schreiber, N.M., Genzel, R., Lutz, D., & Sternberg, A. 2003, ApJ, 599, 193