

DRM Update

Joe Liske



S3-1: Direct imaging of exoplanets

Szymon Gladysz

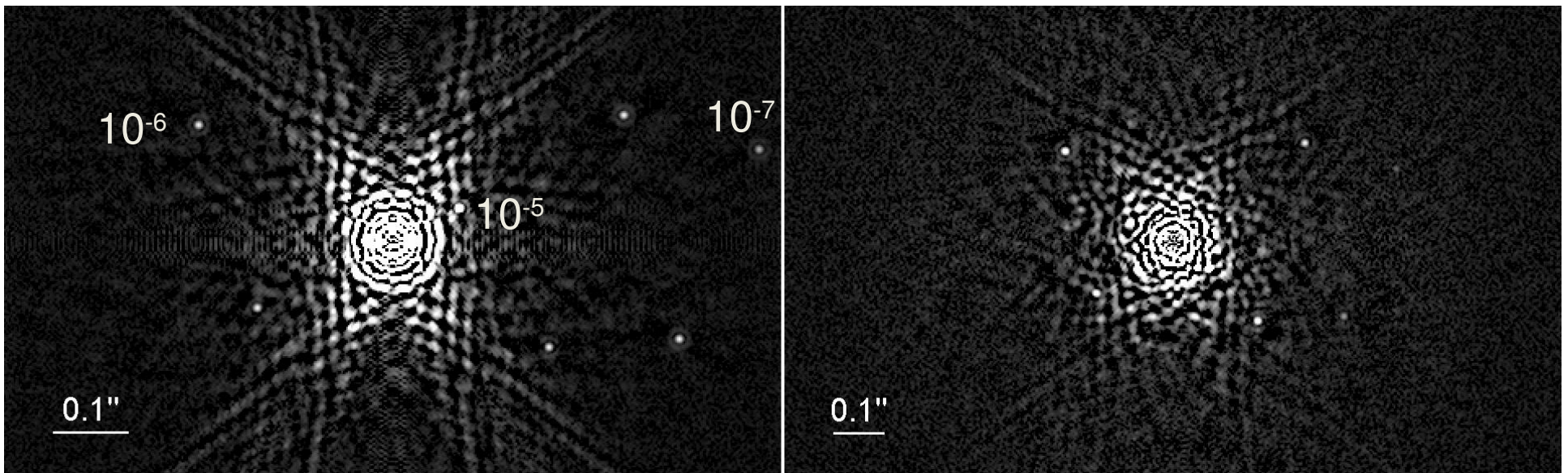
Comparison between high-contrast imaging with XAO and with the telescope's SCAO.

Same planets, same atmosphere, same aberrations, same telescope, same exposure time (10 seconds).

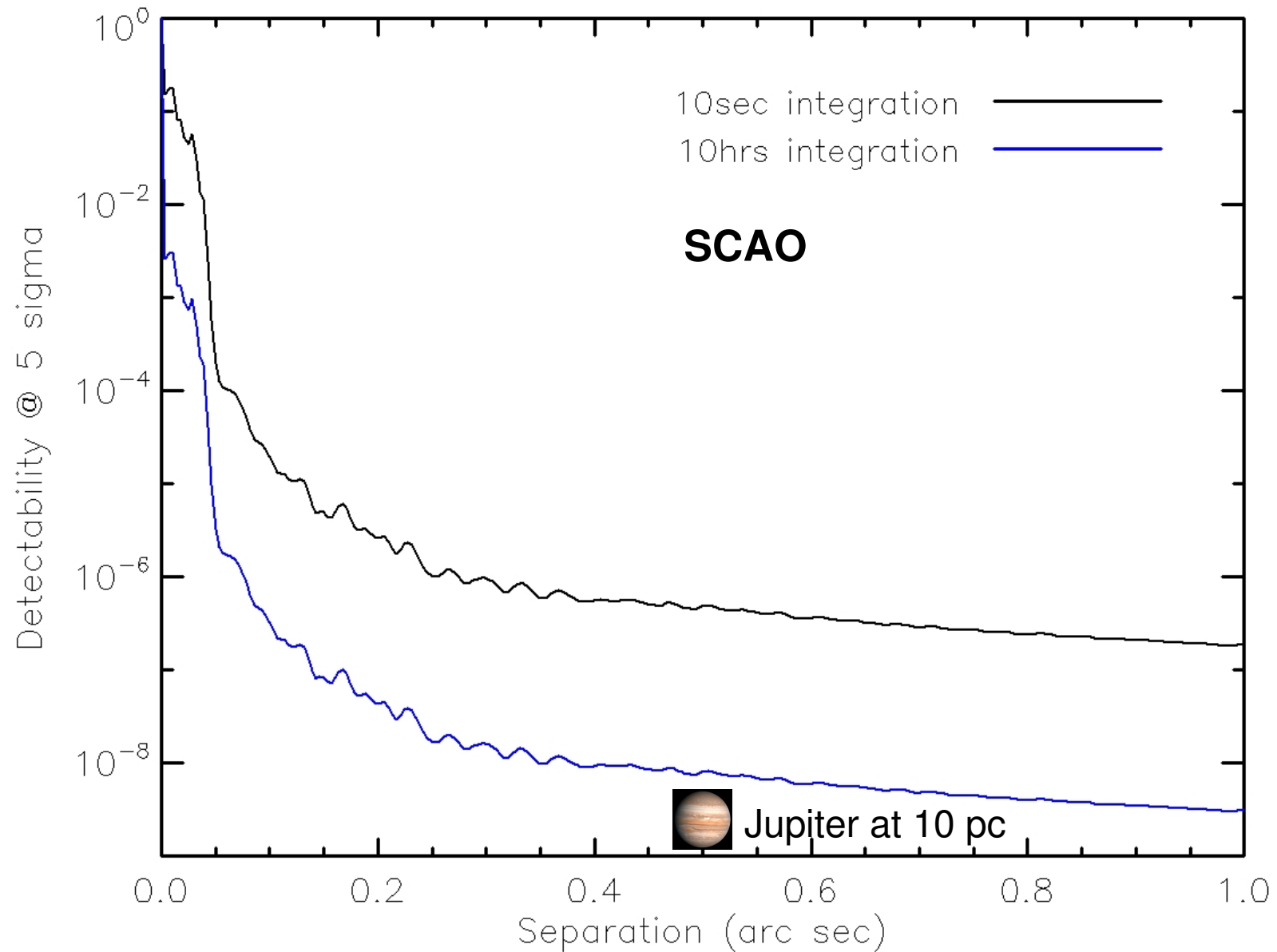
Different IFUs (spectral ranges).

XAO

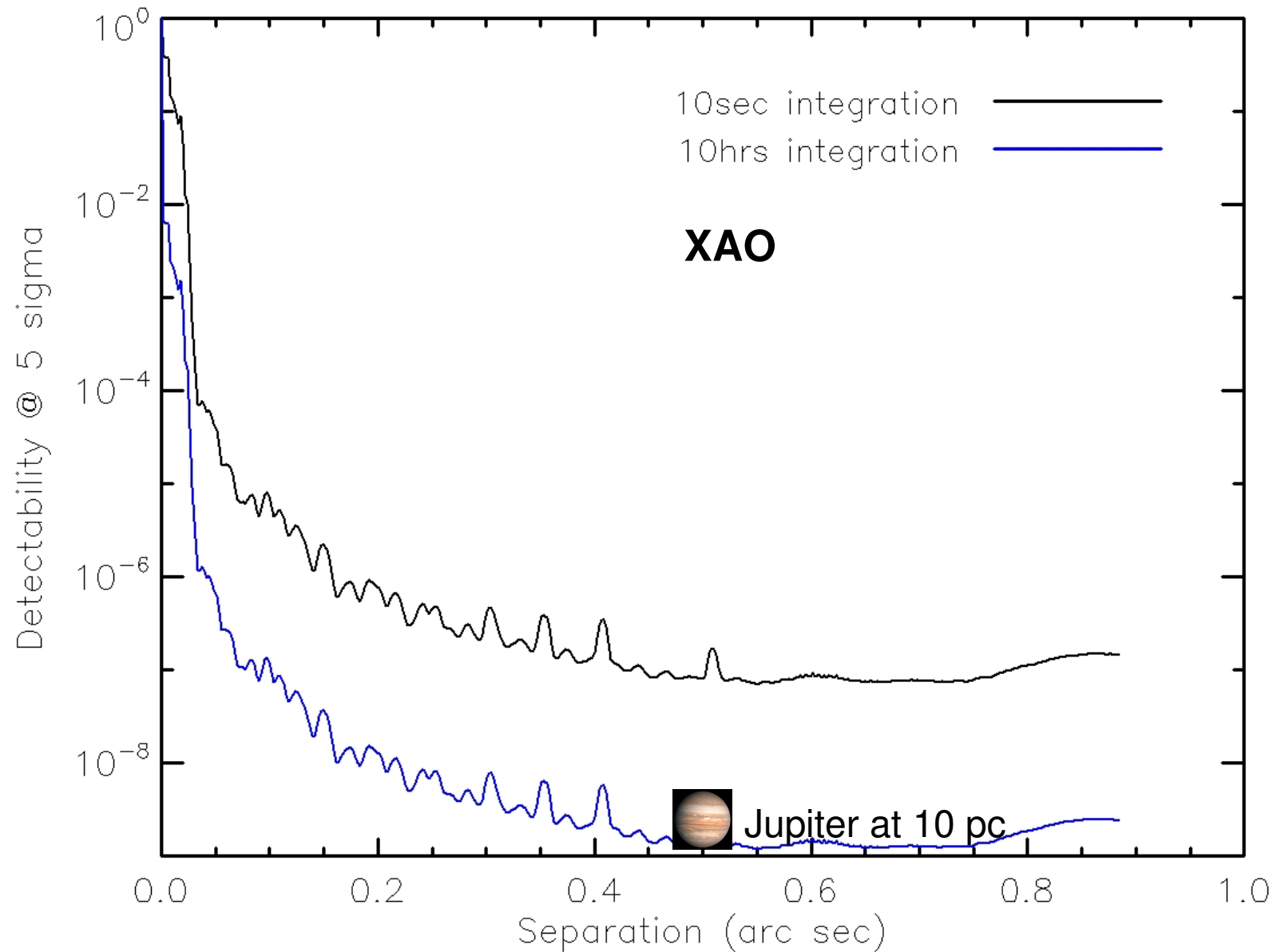
SCAO



S3-1: Direct imaging of exoplanets



S3-1: Direct imaging of exoplanets



S3-2: RV detection of exoplanets

- Dominique Naef has been recruited to “translate” the DRM work of the Geneva group (see previous presentations by S. Udry) into a DRM report. Started 01 Oct.

S9-1: Imaging of circumstellar disks

Daniela Villegas

Model (C. Pinte)

Star: TTauri, 3900°K, $3R_{\odot}$

Disk: - face-on, $10^{-3} M_{\odot}$

- $R_{in} = 0.8\text{AU}$

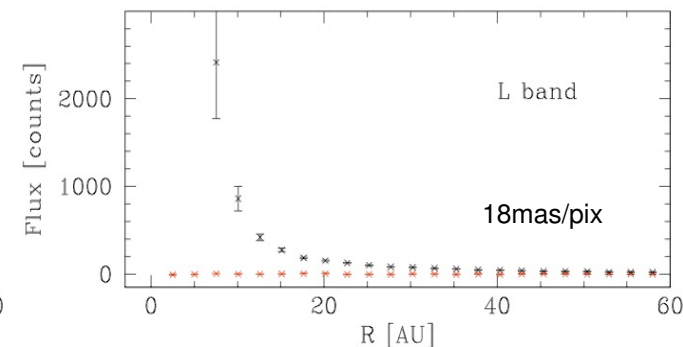
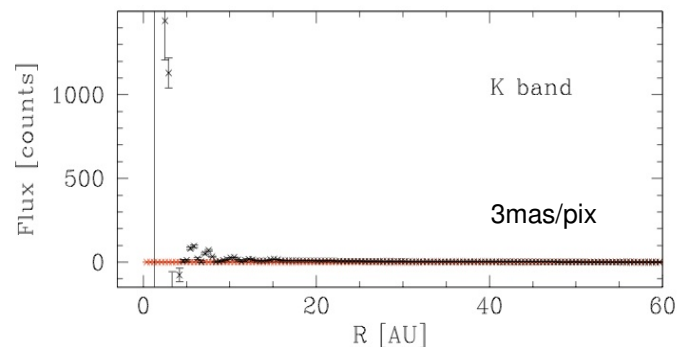
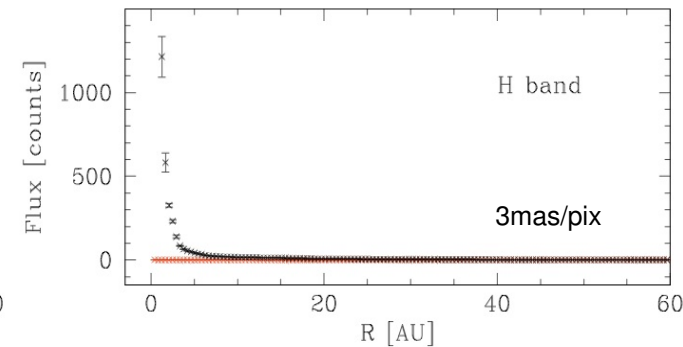
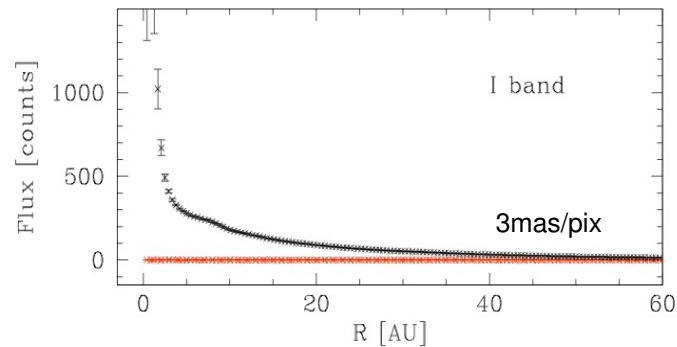
- $R_{out} = 400\text{AU}$

Gap: - Gaussian shape

- $R = 10\text{AU}$

- width = 2AU

Disk Detection: 140pc, image PSF known



Gap detection

2AU gap \rightarrow ~ 5 pix at 140pc (IR only)

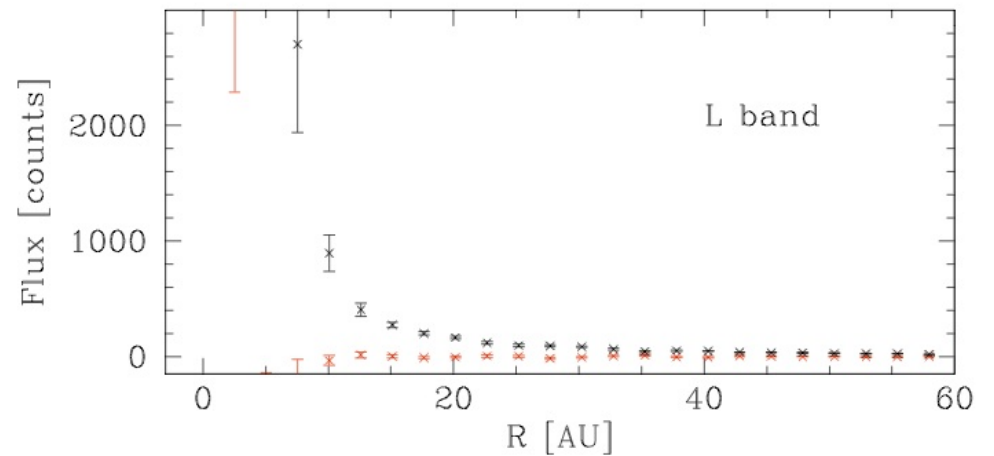
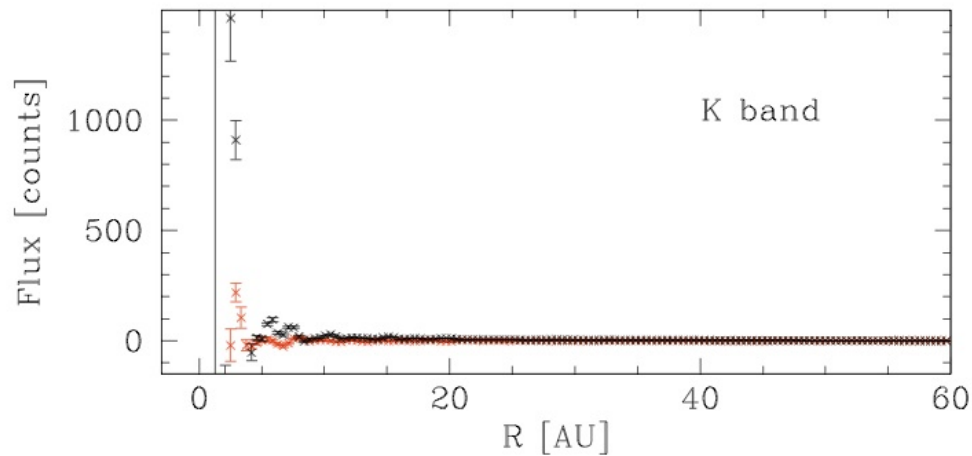
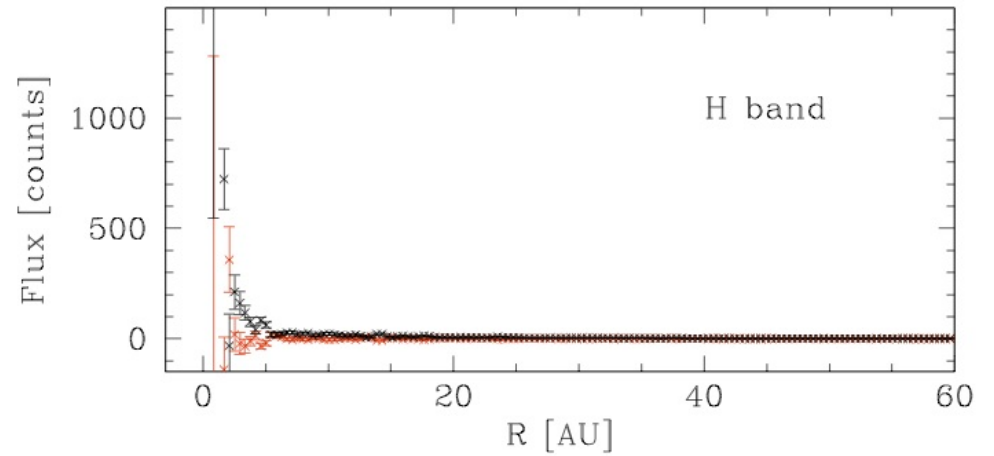
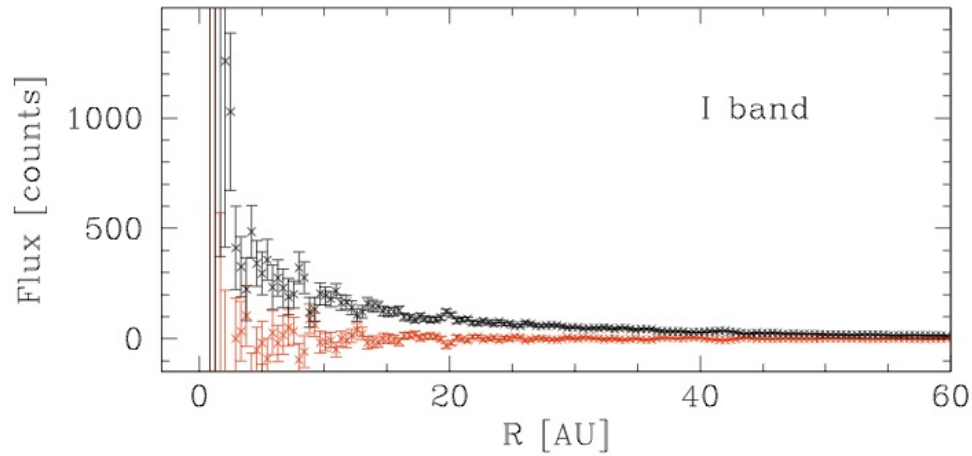
Requires the use of precise deconvolution techniques.

Currently testing best deconvolution approach.

- Imposes requirement on minimum exposure time of instruments (~ 0.01 s in K band).
- Requires good PSF knowledge to be feasible at larger distances.

S9-1: Imaging of circumstellar disks

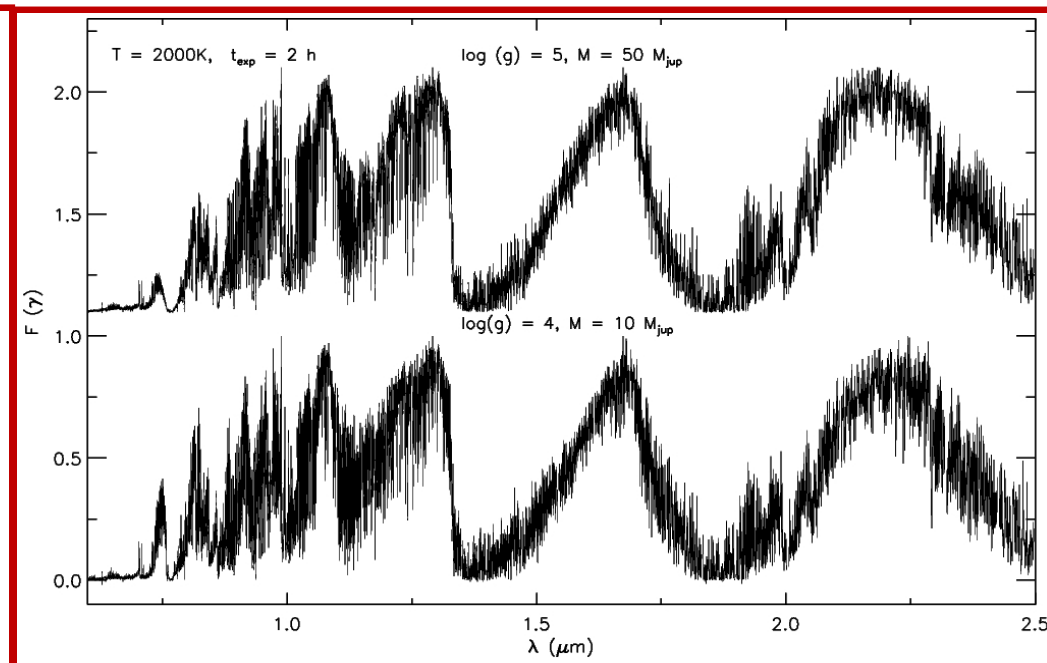
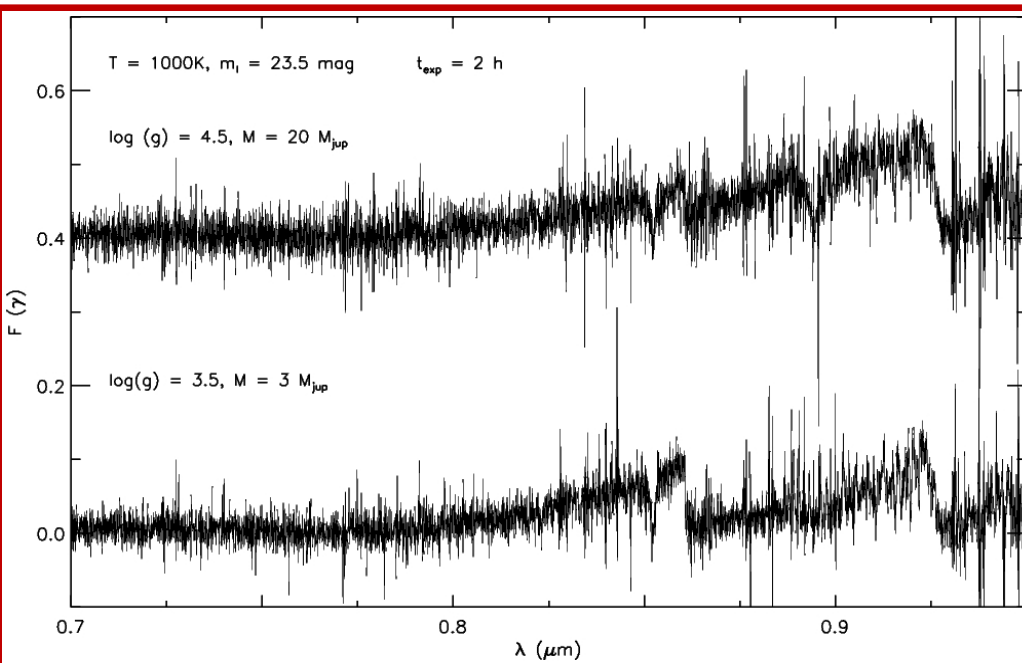
Disk Detection: 140pc, image PSF rotated by 90 deg



S5-1: Characterizing the lowest mass free-floating objects in star forming regions

Annalisa Calamida

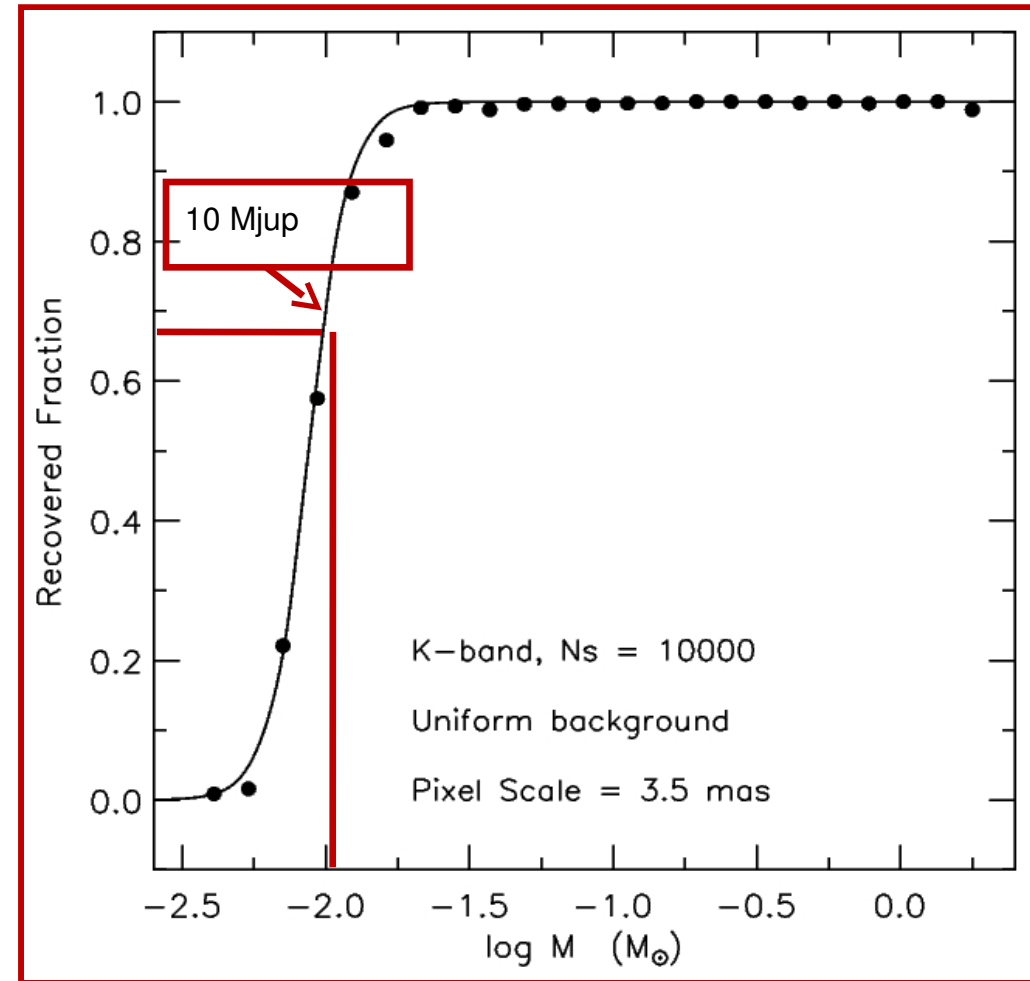
- Simulations in progress.
- Gravity effects observable in $R \sim 4000$ spectra of planetary mass objects in star forming regions at DM ~ 6 mag.
- Details of analysis still need to be clarified.



S5-3: Giant planet-mass objects in the LMC

Annalisa Calamida

- Nearly complete (90% for 17-24 M_{jup}) sample of BDs above the deuterium-burning limit in LMC and possibly in other galaxies.
- Planetary mass objects ($< 10 M_{\text{jup}}$) in the LMC in favourable conditions.
- V1 of report online.



G4-2: The chemo-dynamical structure of galaxies

- Report in progress.
- See presentation by G. Battaglia.

G4-3: First stars relics in the Milky Way and satellites

Gael James

- New PI? Sofia Feltzing.
- New simulator: Gael James has been recruited to work on this case.
- All tools for simulation and analysis already in place.
- Gael and Sofia to define set of questions to be answered by simulations.

G9: A survey of black holes in different environments

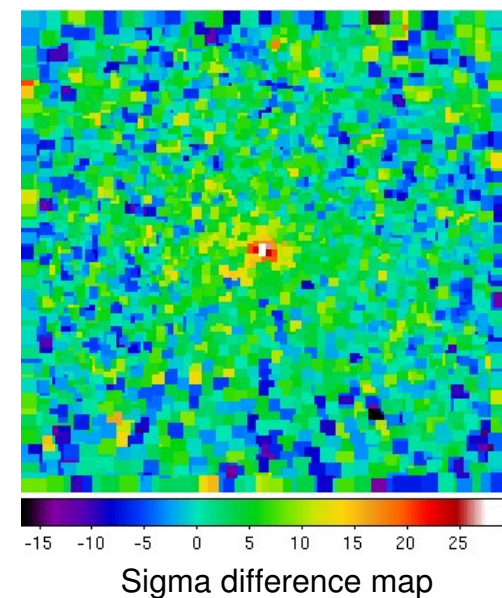
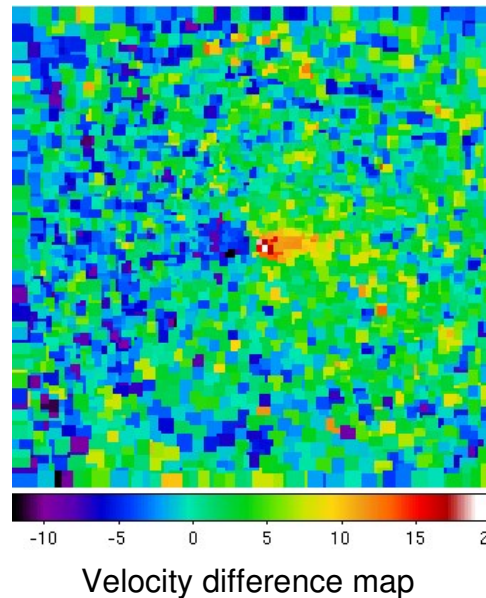
Aybuke Kupcu Yoldas

Realistic IFU simulations:

- including telescope + atmosphere + instrument + noise
- 5 - 10 mas spaxels
- I, z-J, K bands
- Different distances:
 - Virgo cluster (16 Mpc)
 - $z = 0.2$
 - $z = 0.1$
 - $z = 0.05$
- Different BH masses:
 - $10^7 M_{\odot}$
 - $2 \times 10^8 M_{\odot}$
 - $3 \times 10^9 M_{\odot}$
- Different galaxy morphologies:
 - Dwarf elliptical (NGC4486 like)
 - S0 spiral (NGC5308 like)
 - Giant elliptical (M87 like)

Kinematic analysis:

- Penalized Pixel fitting (pPXF, Cappellari & Emsellem 2004)
- Difference of velocity maps with and without BH
- Difference of velocity dispersion maps with and without BH



$1.25 \times 10^7 M_{\odot}$ BH @ 16 Mpc

5 mas spaxel, LTAO, K-band, ~2 h exposure time

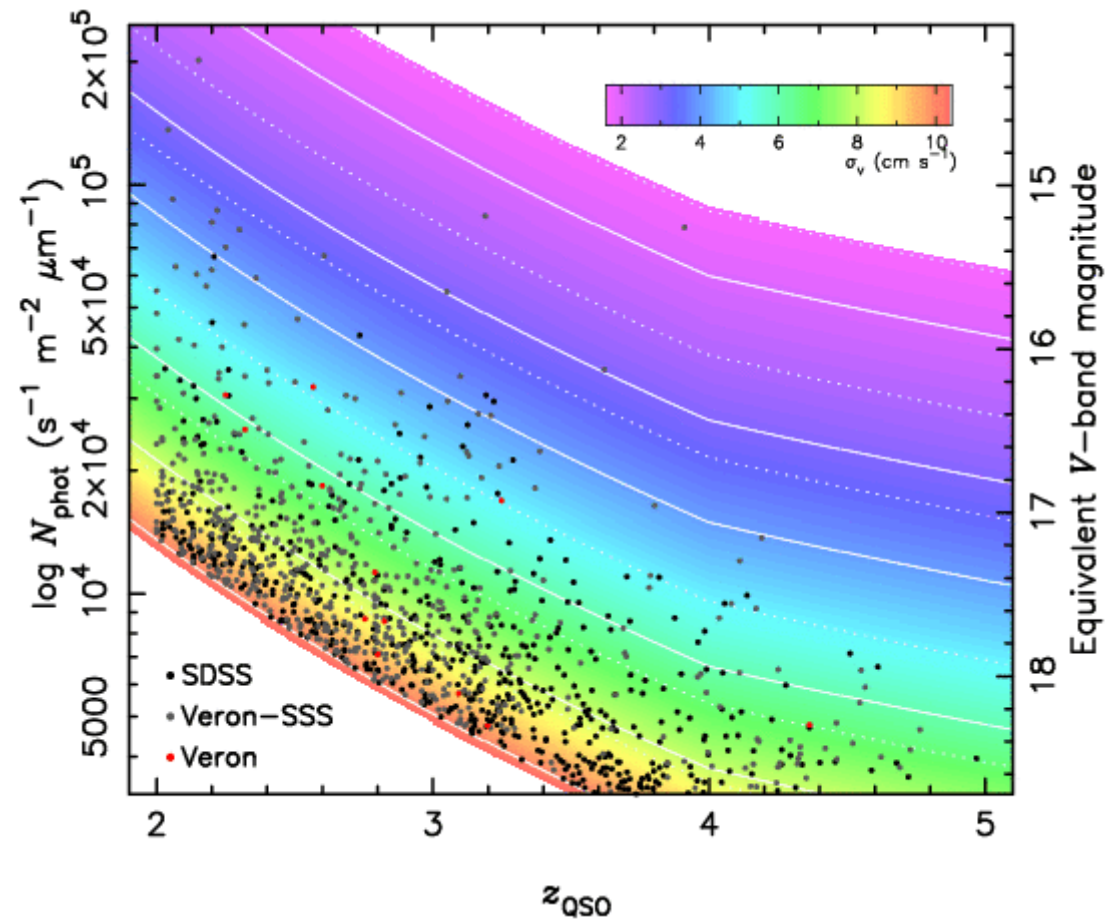
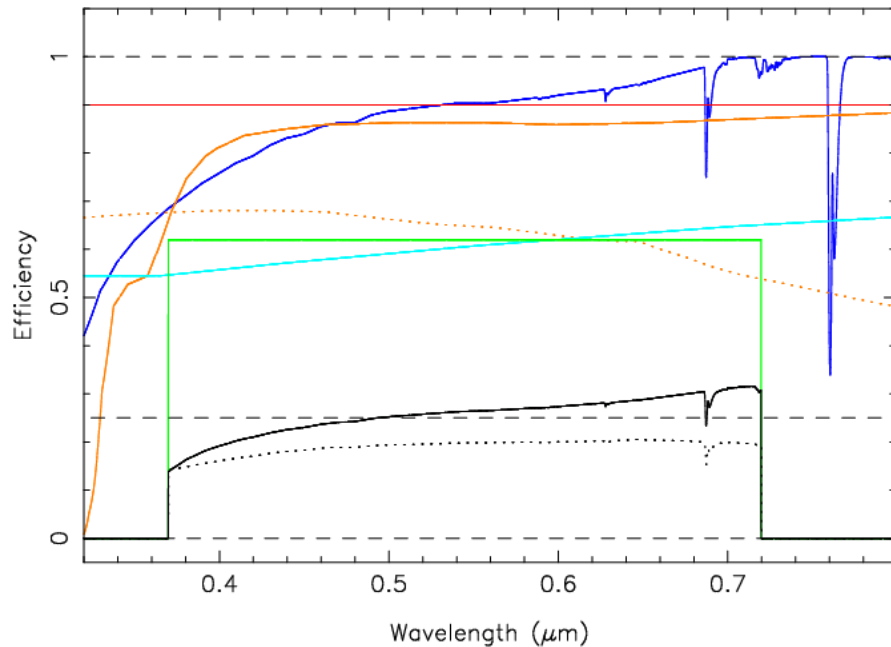
C4: The highest redshift galaxies at $z > 6$

Bram Venemans

- New PI: Matt Lehnert.
- Revision of proposal and setting of specific goals of simulations in progress.
- Simulation tools nearly complete.
- Test simulations ran successfully, agree with ETC.
- Simulations will run during October.
- Analysis of results in November.
- Report in December.

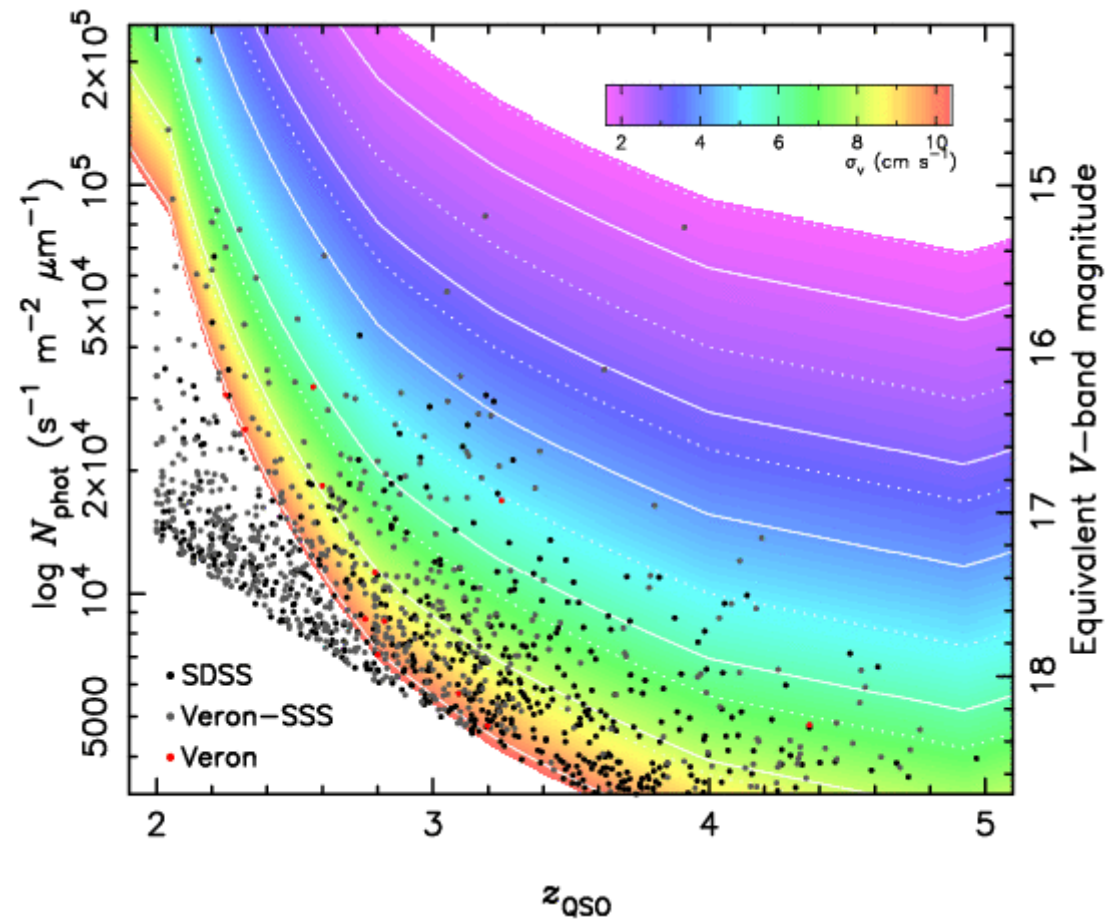
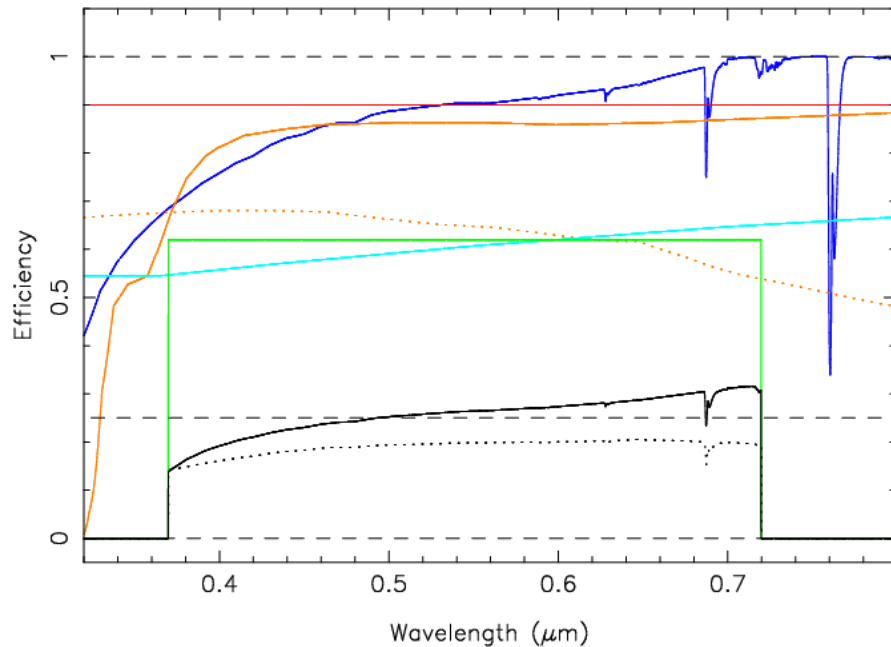
C2: A dynamical measurement of the expansion history of the Universe

- V1 of report online.
- Added wavelength dependent throughput and wavelength cut-offs.



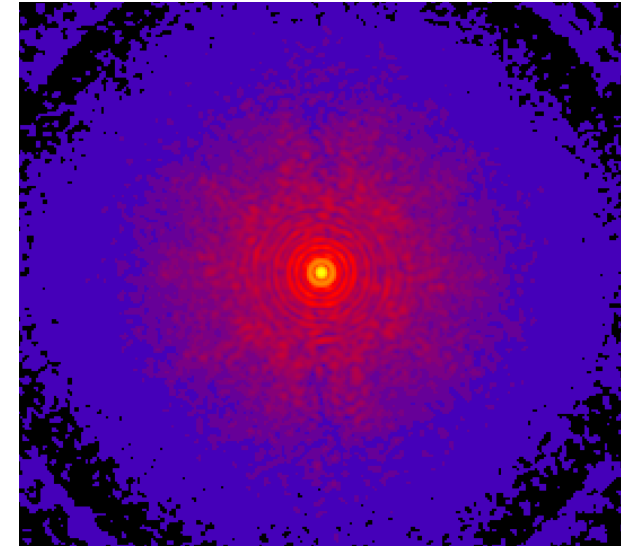
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Other updates

- All simulated ESO PSFs in the database have been fit with `eltpsffit`. The fits are available in the database.

A screenshot of a web browser displaying the E-ELT Design Reference Mission website. The browser's address bar shows the URL `http://www.eso.org/sci/facilities/eelt/science/drm/soft_tools.html`. The page features a navigation menu on the left with categories like 'Science Users Information', 'Observing Facilities', and 'Science with E-ELT'. The main content area is titled 'SOFTWARE TOOLS' and contains a list of tools:

- `eltpsffit`: For fitting PSFs with combinations of analytical functions (Airy, Gaussian, Lorentzian, Moffat, ...).
- `E-ELT simulator`: For simulating images and datacubes. Offered by M. Puech at the Observatoire Paris Meudon.
- `Stellar population code`: Three pieces of code to generate stellar populations and star catalogues. Includes the `BaSTI` isochrones.

 The right sidebar contains sections for 'E-ELT Science', 'What's New?' (with dates like 05 Sep 09), 'Science Case', 'Science Working Group', and 'Design Reference Mission'.

- New web page for software tools.