



The experience from VISIR and the design of an ELT mid-infrared instrument

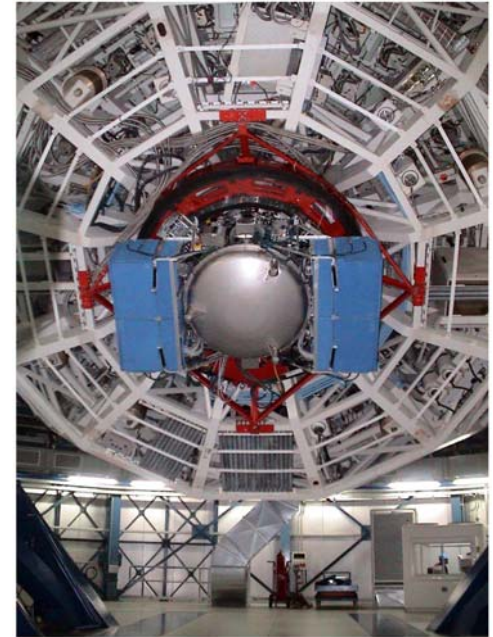
VLT Imager and Spectrometer for the InfraRed

Commissioned in 2004 on Melipal

Diffraction-limited (seeing $< 0.8''$)

Multi-mode instrument :

- Imaging: N(8-13 μm) and Q(16-24 μm)
18 filters (R=20 to 100)
pfov: 0.075" and 0.127"
- Spectroscopy: LR (R=300),
MR (3000) and
HR (15000-30000 in Q or N)



VISIR Mounted behind the 8.2-m Mirror of Melipal

ESO PR Photo 16a/04 (12 May 2004)

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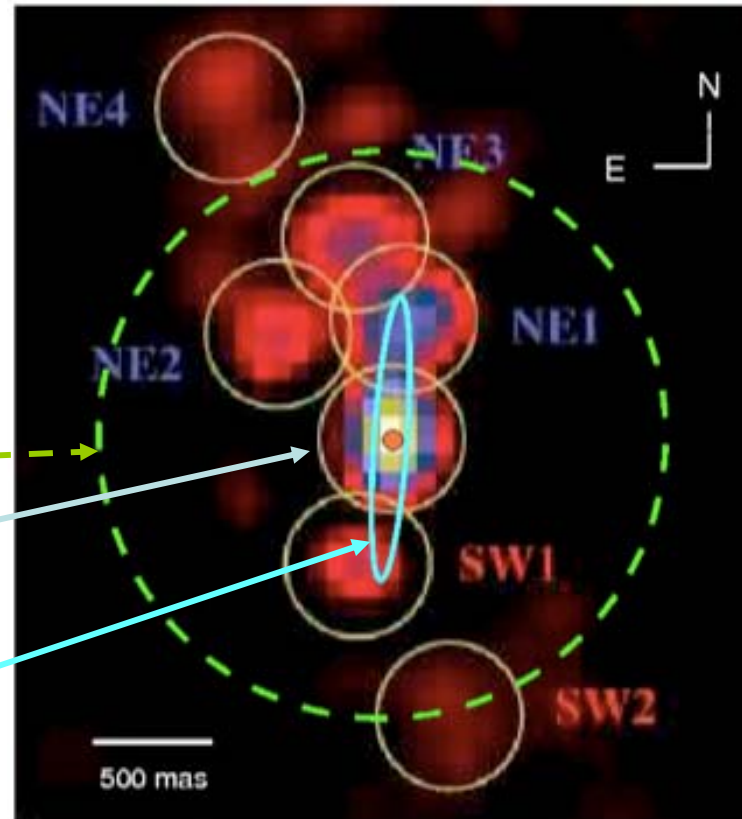


Spatial resolution and sensitivity:

Spitzer: $\sim 10 \mu\text{Jy}$

VISIR: $\sim 1 \text{ mJy}$

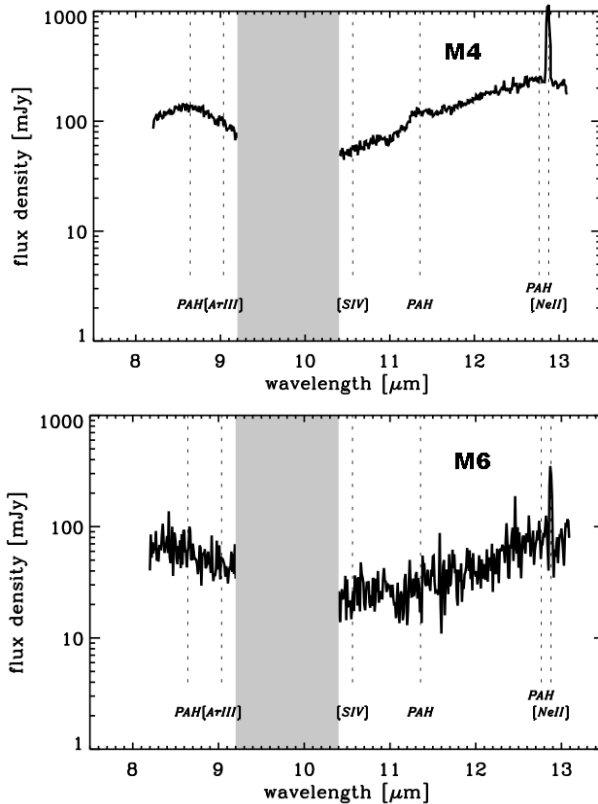
MIDI: $\sim \text{Jy}$ (Jaffe)



NGC 1068

Poncellet et al. 07

SSCs in active galaxies

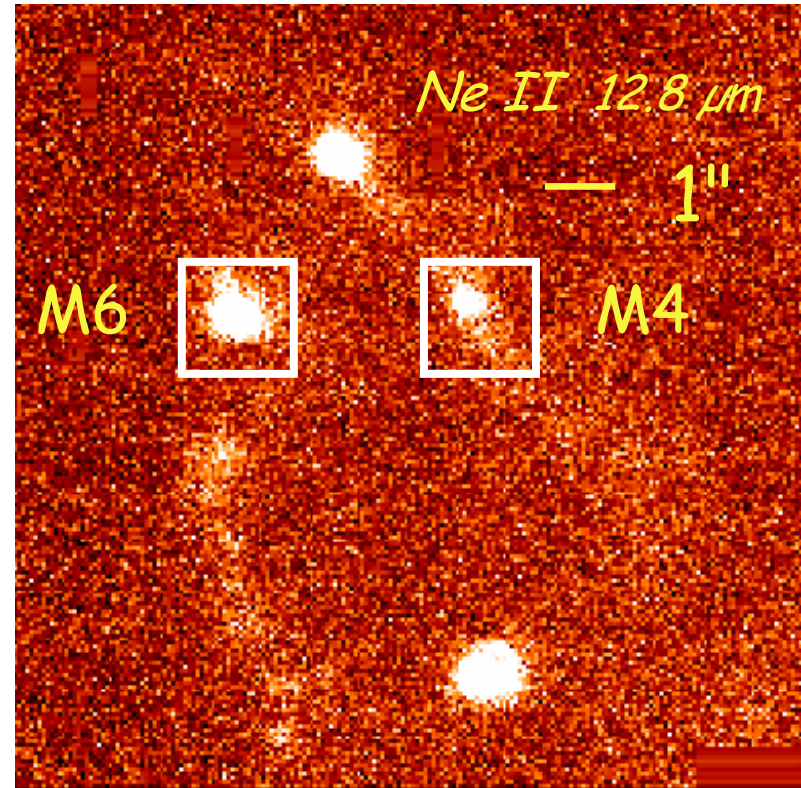


Cluster parameters:

Age ~ 7 Myr

Luminosity $\sim 5 \times 10^9 L_{\odot}$

Mass $\sim 10^6 M_{\odot}$

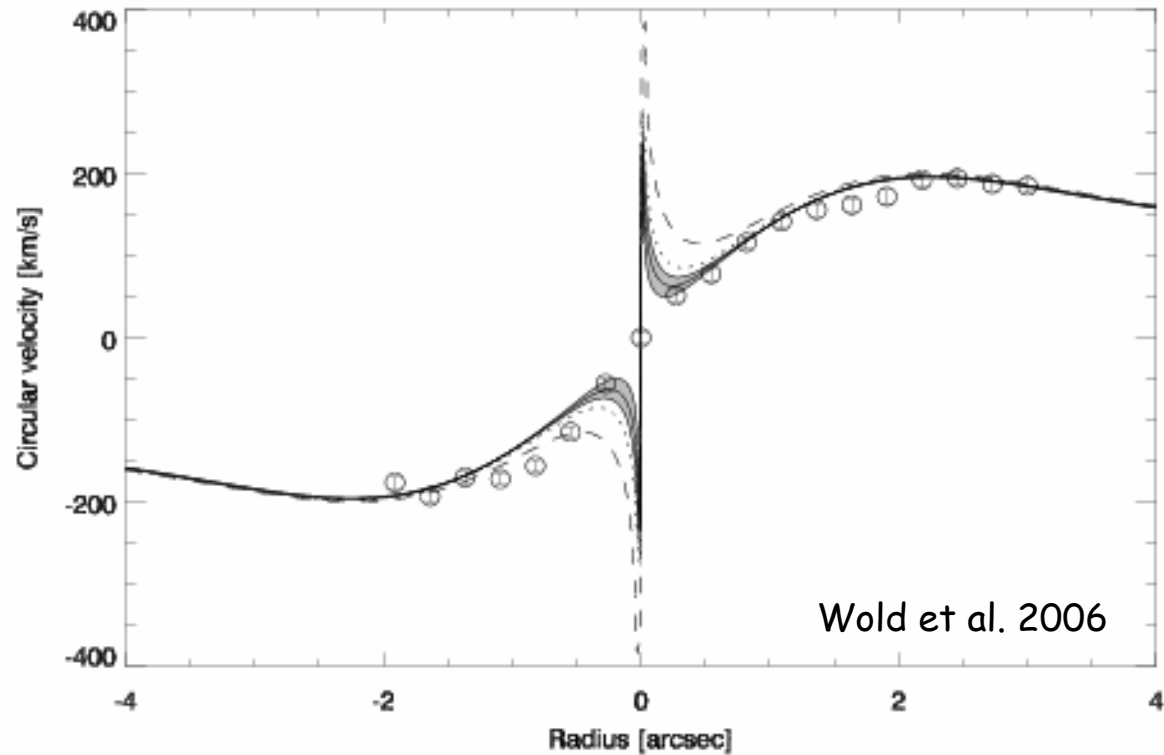
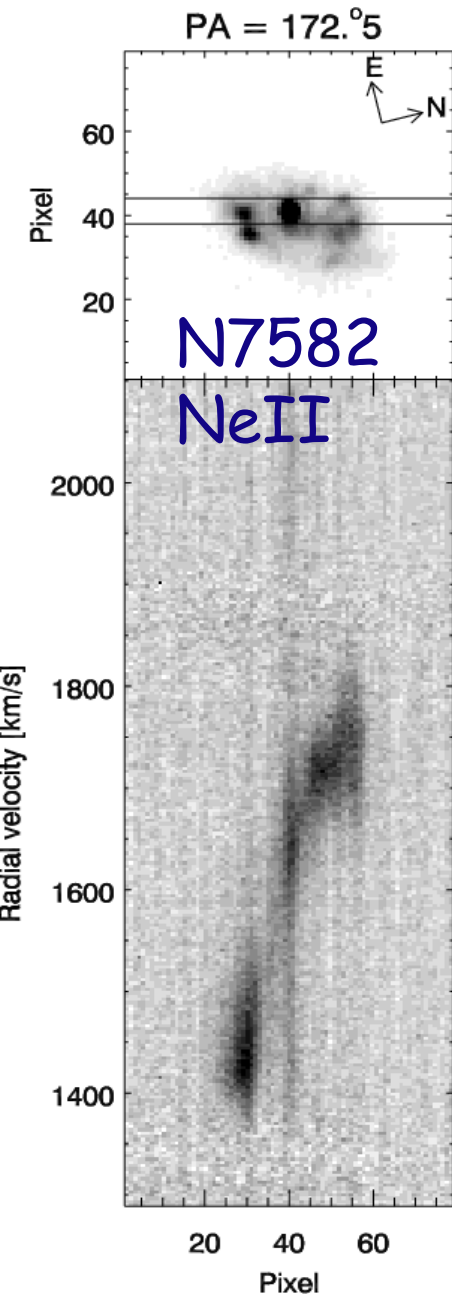


NGC1365

Galliano et al.

Unresolved by Spitzer

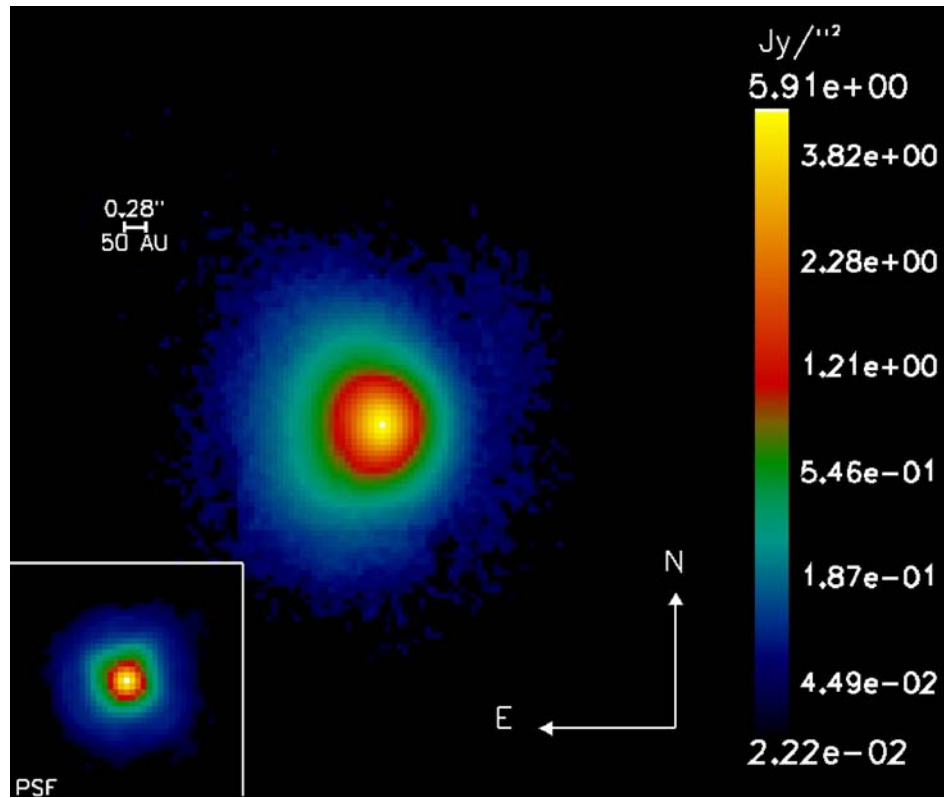
High-resolution spectroscopy



Circumnuclear velocity: 13km/s resolved

Central black hole mass: $< 5.5 \times 10^9 M_{\odot}$

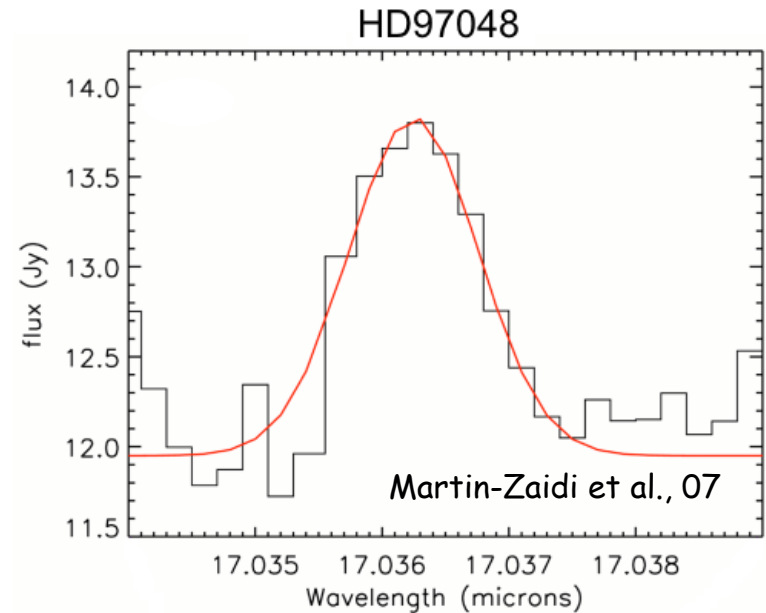
Protoplanetary disk at 0.3''



HD97048

Lagage et al., 06

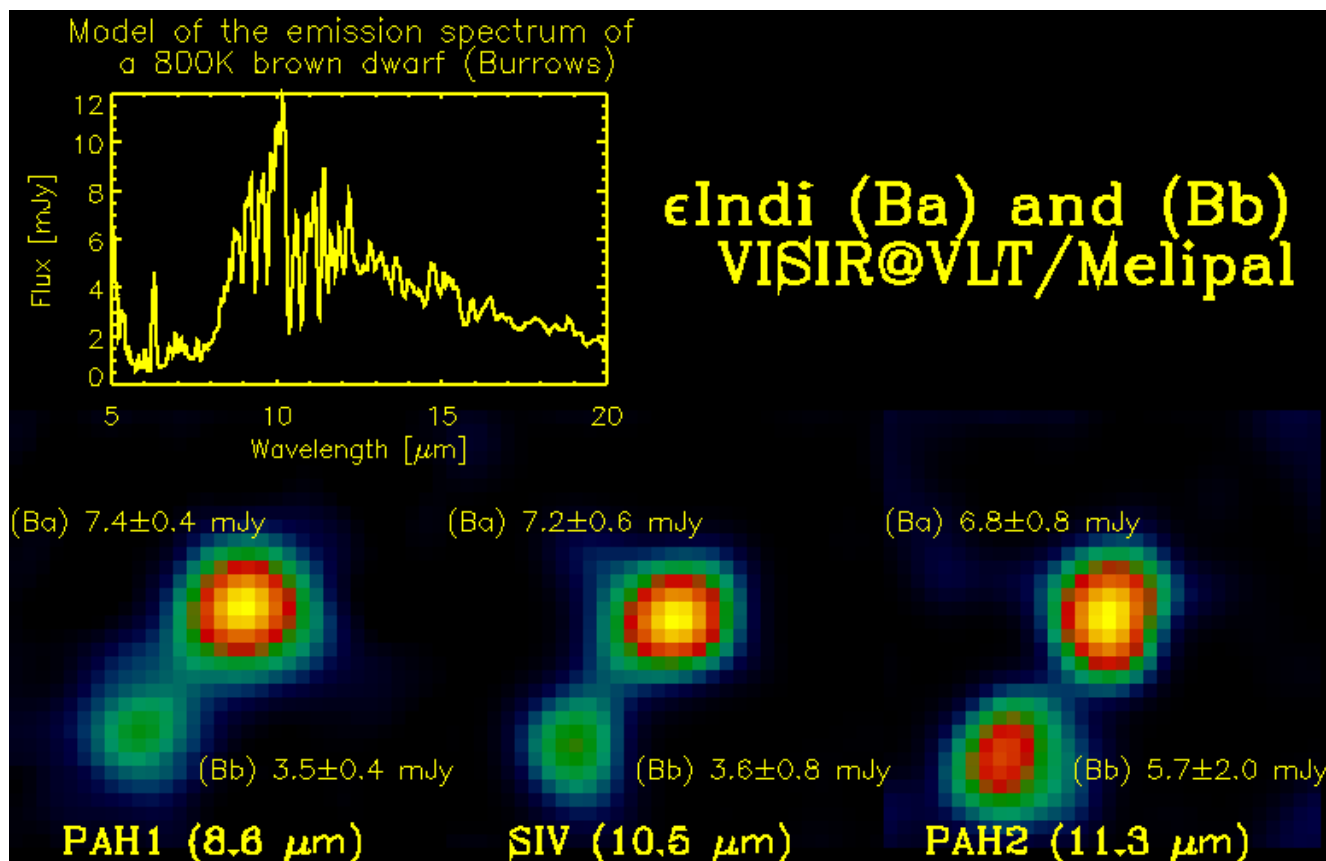
Isophotes -> flaring disk geometry



Warm H_2 gas: $\sim 0.01 - 1 M_J$
within 35AU

Disk age $\sim 3\text{Myr}$

Low-mass companions

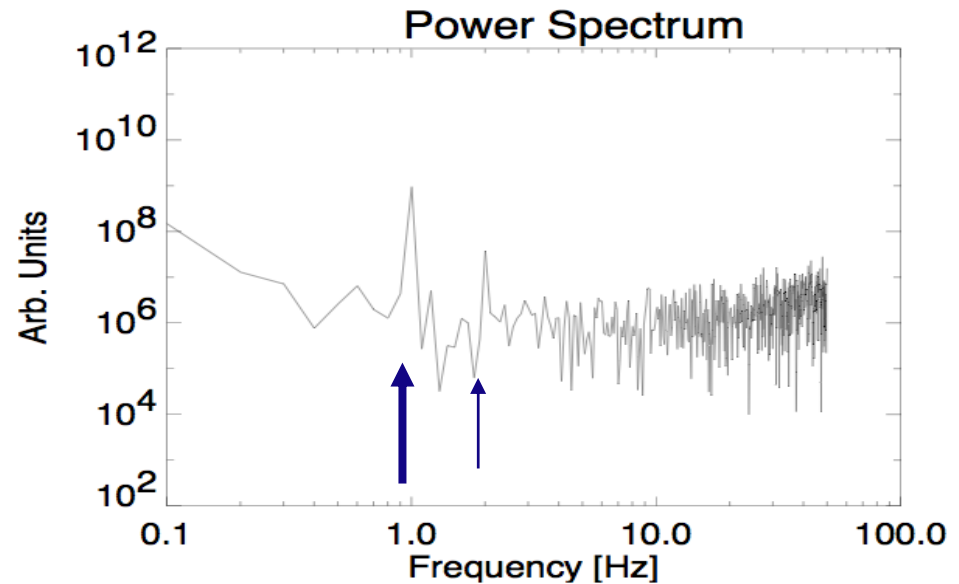
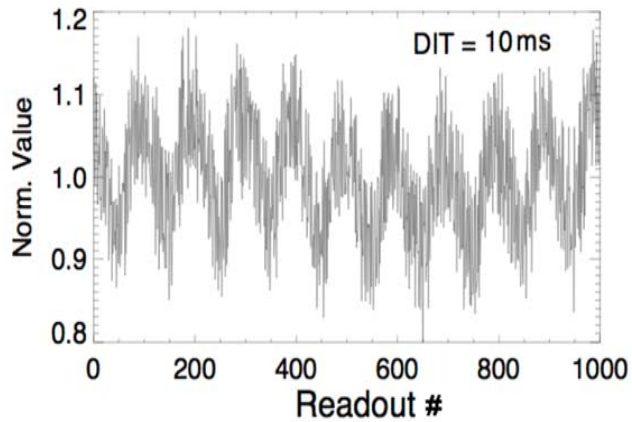


VISIR viz. Spitzer:

Sterzik & Pantin, 08

Characterization of spectral types

VISIR detector: reads + cooling

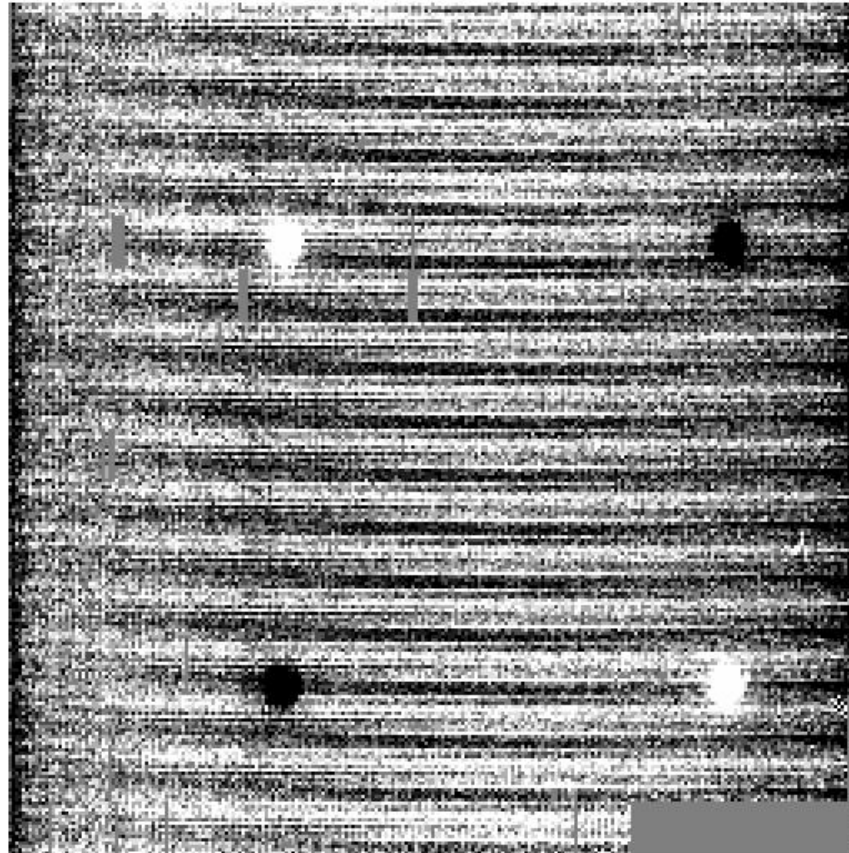


1Hz feature from ccc

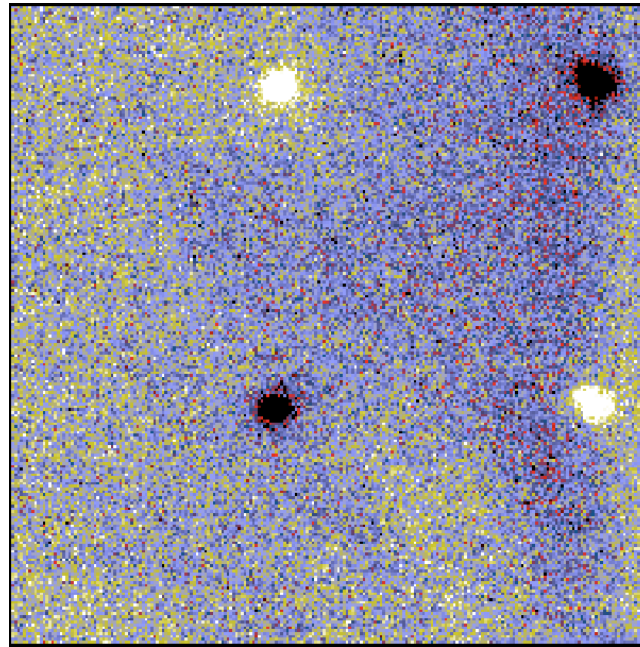
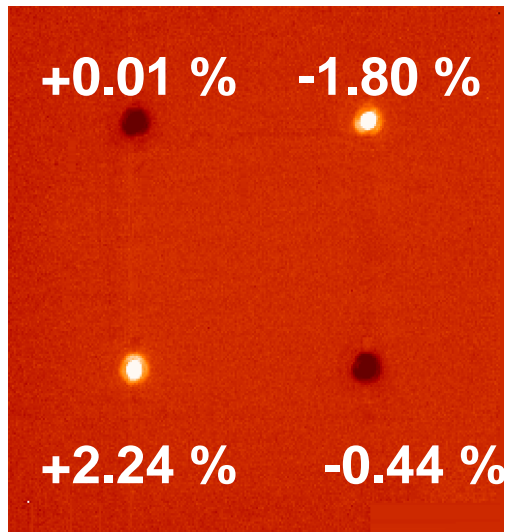
Present VISIR detectors

Cosmetics:

- bad pixels
- striping

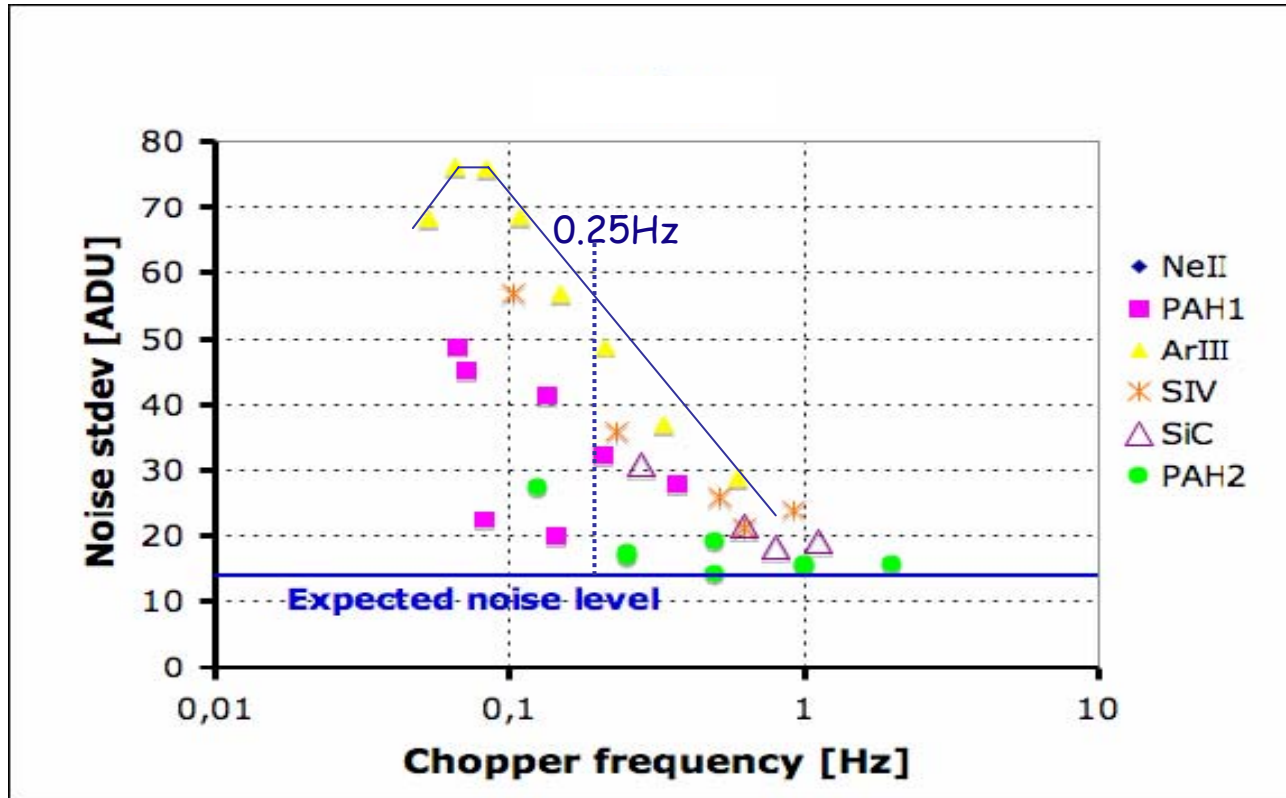


Large scale gradient ?



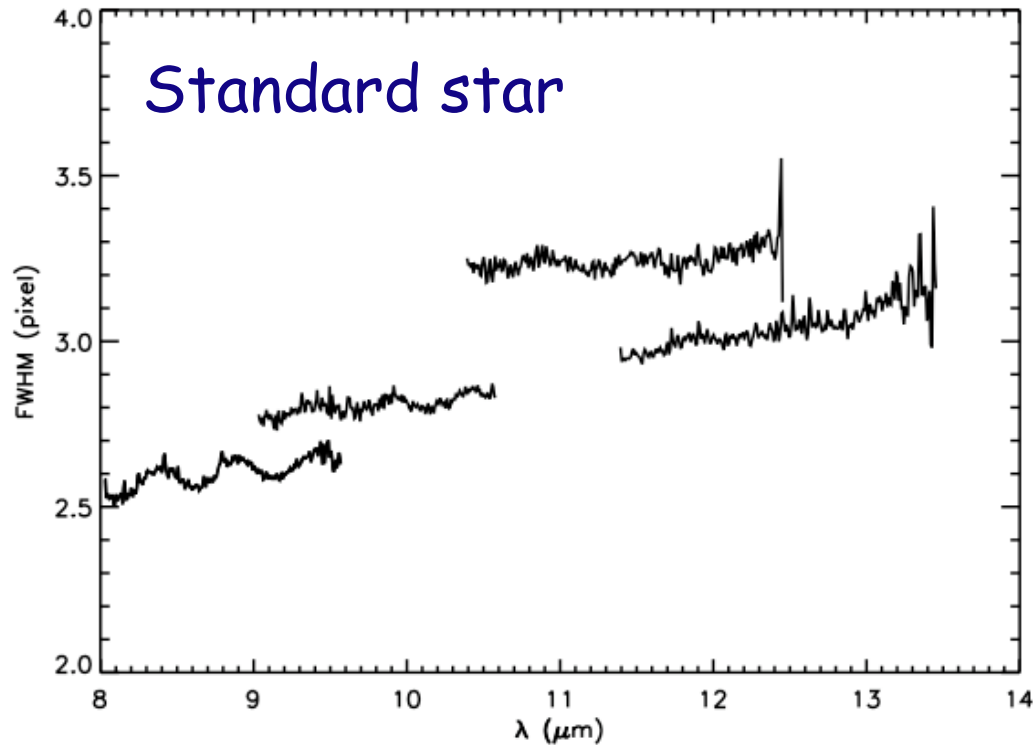
- Flat fielding or
- Nodding parameters: AO replay ?, ...

Chopping: background subtraction



Chopp. frequency < 1 Hz → increase of noise

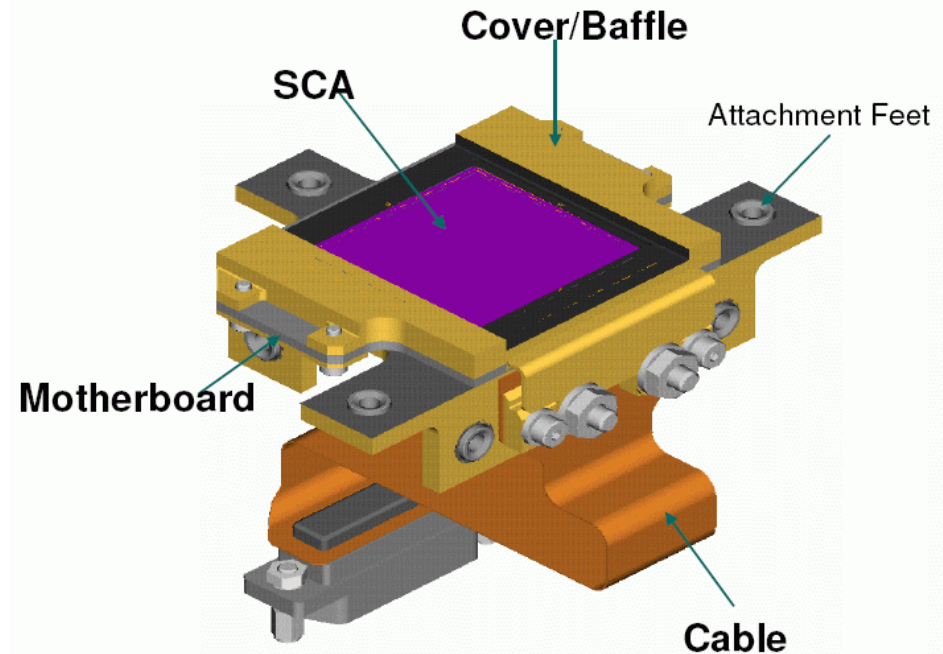
VISIR: Low res spectroscopy



Need: N-band in 1 exposure

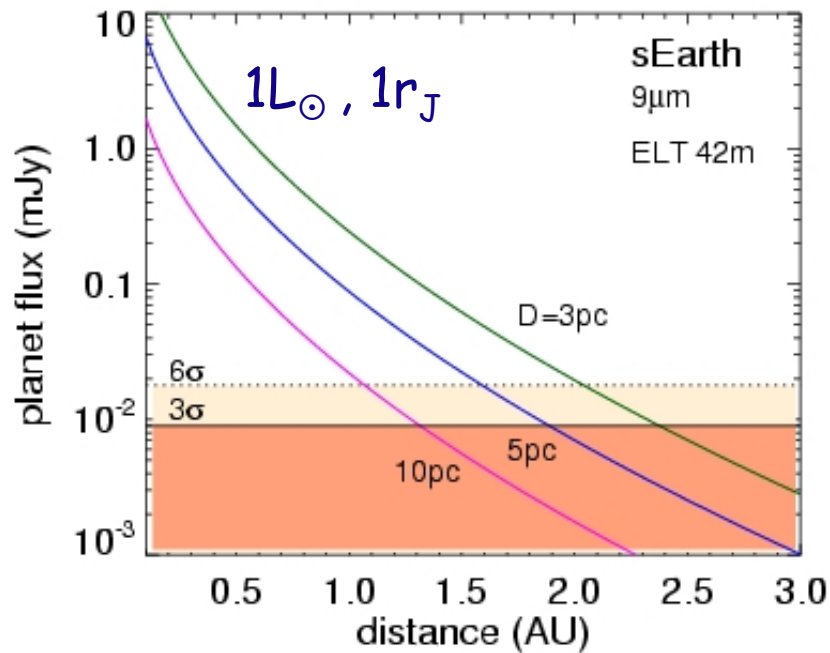
Future detectors: Acquarius

- BLIP performance
- Larger format 1k x 1k
- Pixel gain stability $\sim 10^{-5}$:
flat-fielding ability
nodding only ?



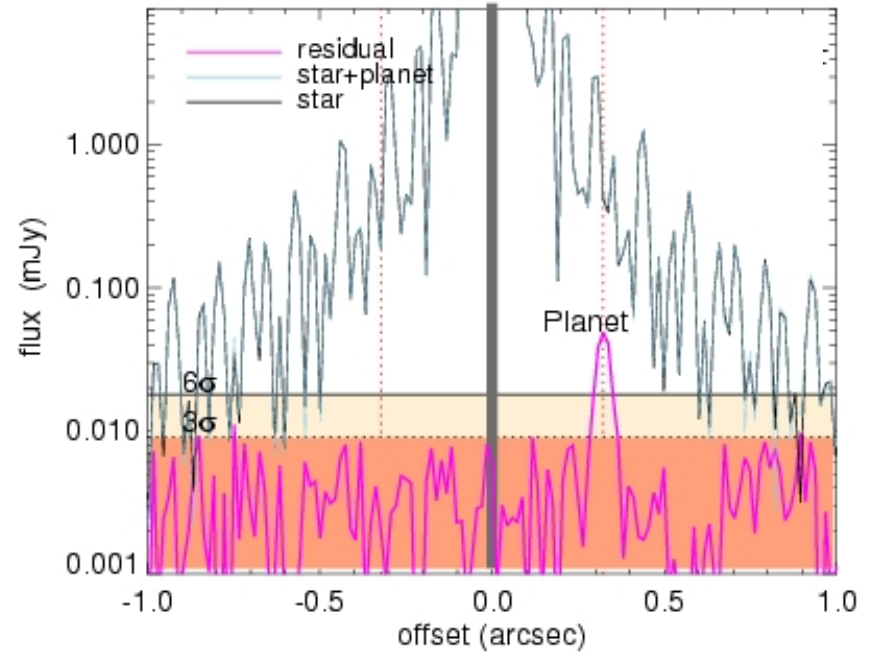
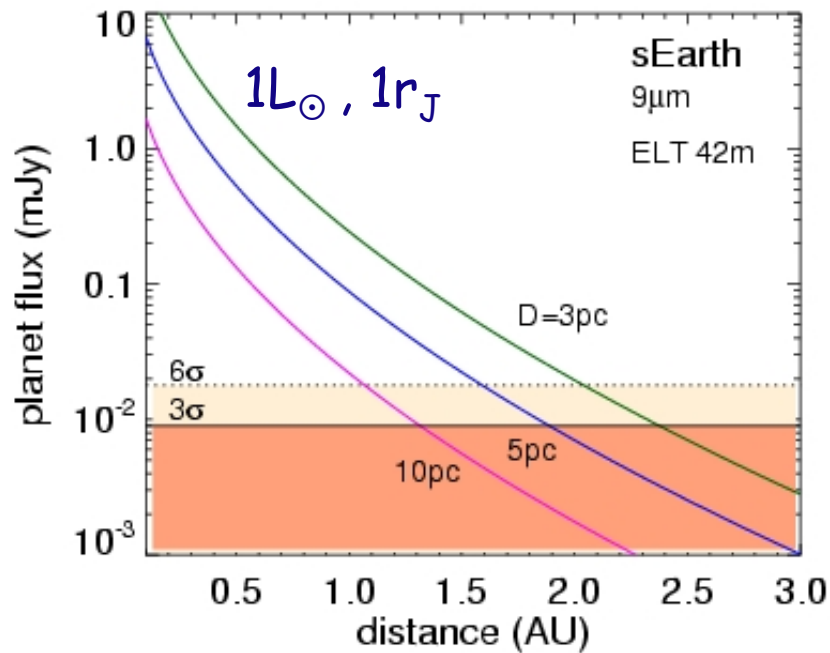
MIDI assembly design

Direct MIR imaging of sEarths at the ELT

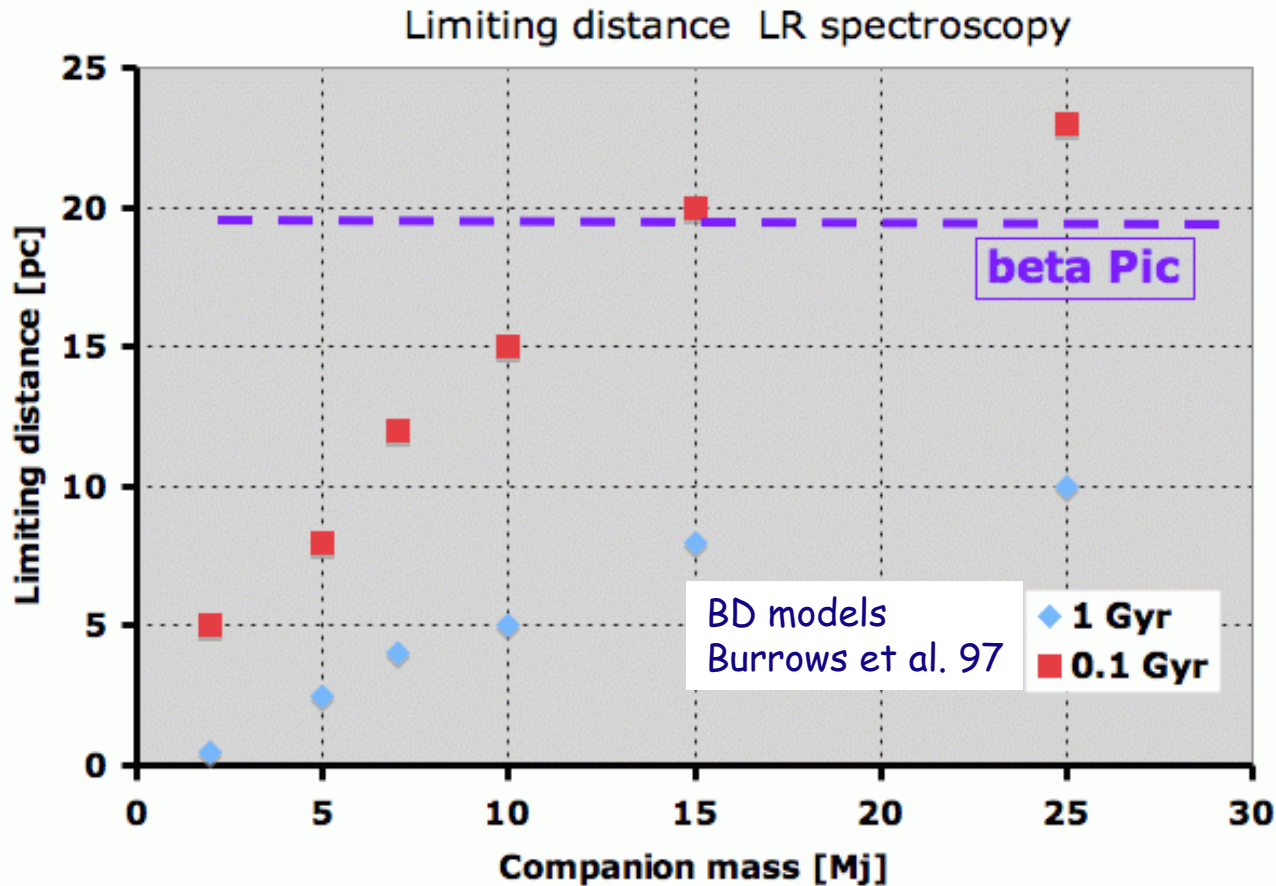


sensitivity limit in 1h

MIR imaging of sEarths



MIR spectra of BD/Gplanets



Resolution ($D=10\text{pc}$)
 JWST $\geq 35\text{AU}$
 MIDI $\geq 5\text{AU}$

