



λ -Orionis Star Forming Region - Credit: *Spitzer*, D. Barrado y Navascués

A DEEP LOOK INTO THE CORE OF YOUNG MASSIVE CLUSTERS

*H. Bouy, N. Huélamo, E. L. Martín, D. Barrado y Navascués, M. Petr-Gotzens, J. Kolb, E. Marchetti, M. Morales-Calderón,
E. Artigau, M. Hartung, F. Marchis, M. Tamura, M. Sterzik, R. Köhler, V. D. Ivanov and the MAD team!*

A DEEP LOOK INTO THE CORE OF YOUNG MASSIVE CLUSTERS

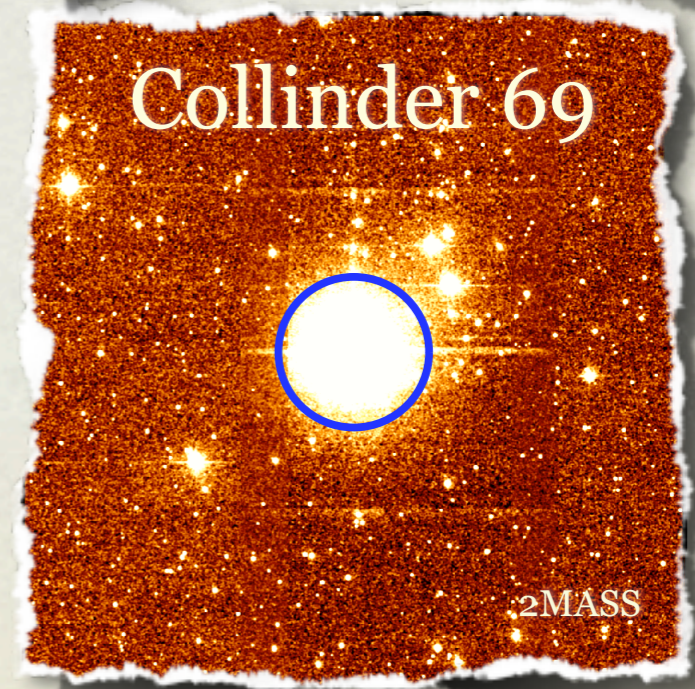
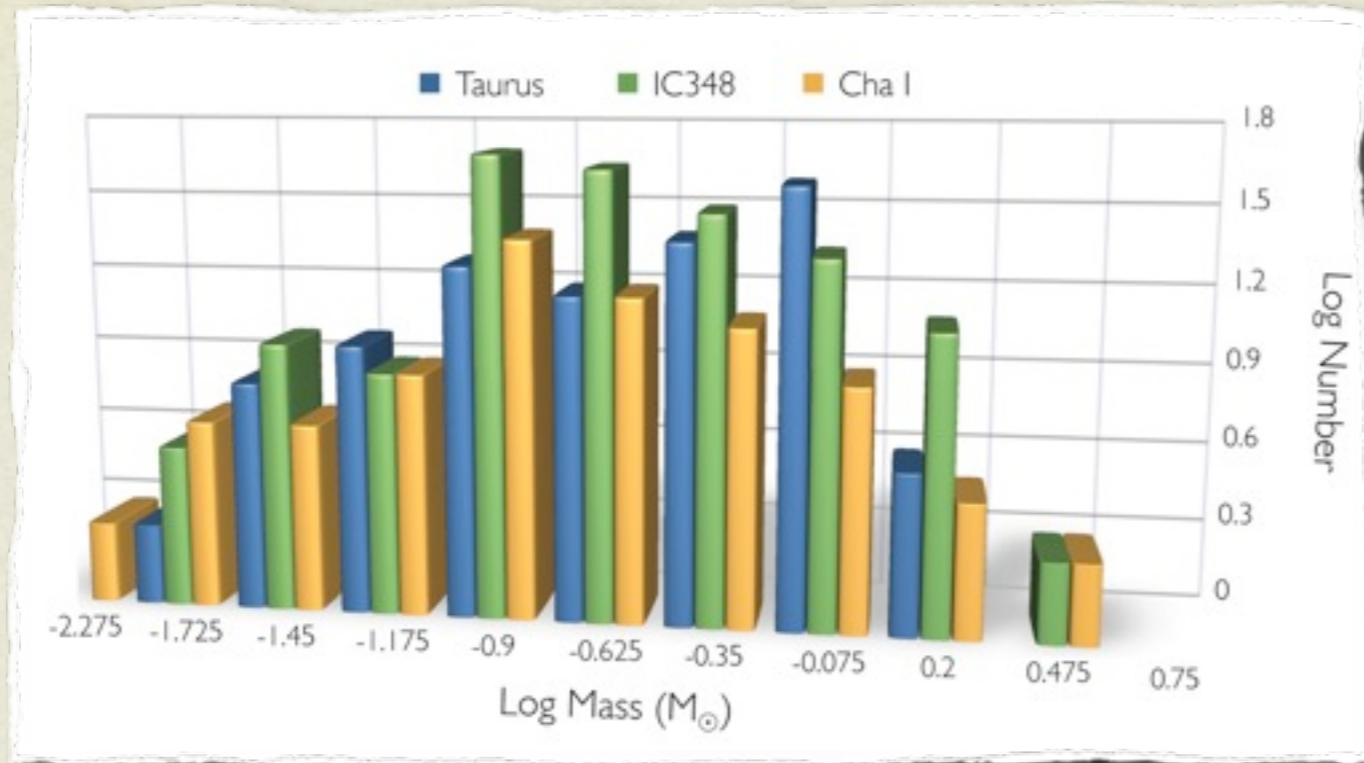
I. Context & Motivation

II. σ -Orionis

III. Collinder 69

IV. On-going work and perspectives..

CONTEXT & MOTIVATION



Substellar mass function is “well” known in a variety of environments, but not so much in the core of young associations

Need for **Wide Field / High Contrast Imaging**

σ -Orionis

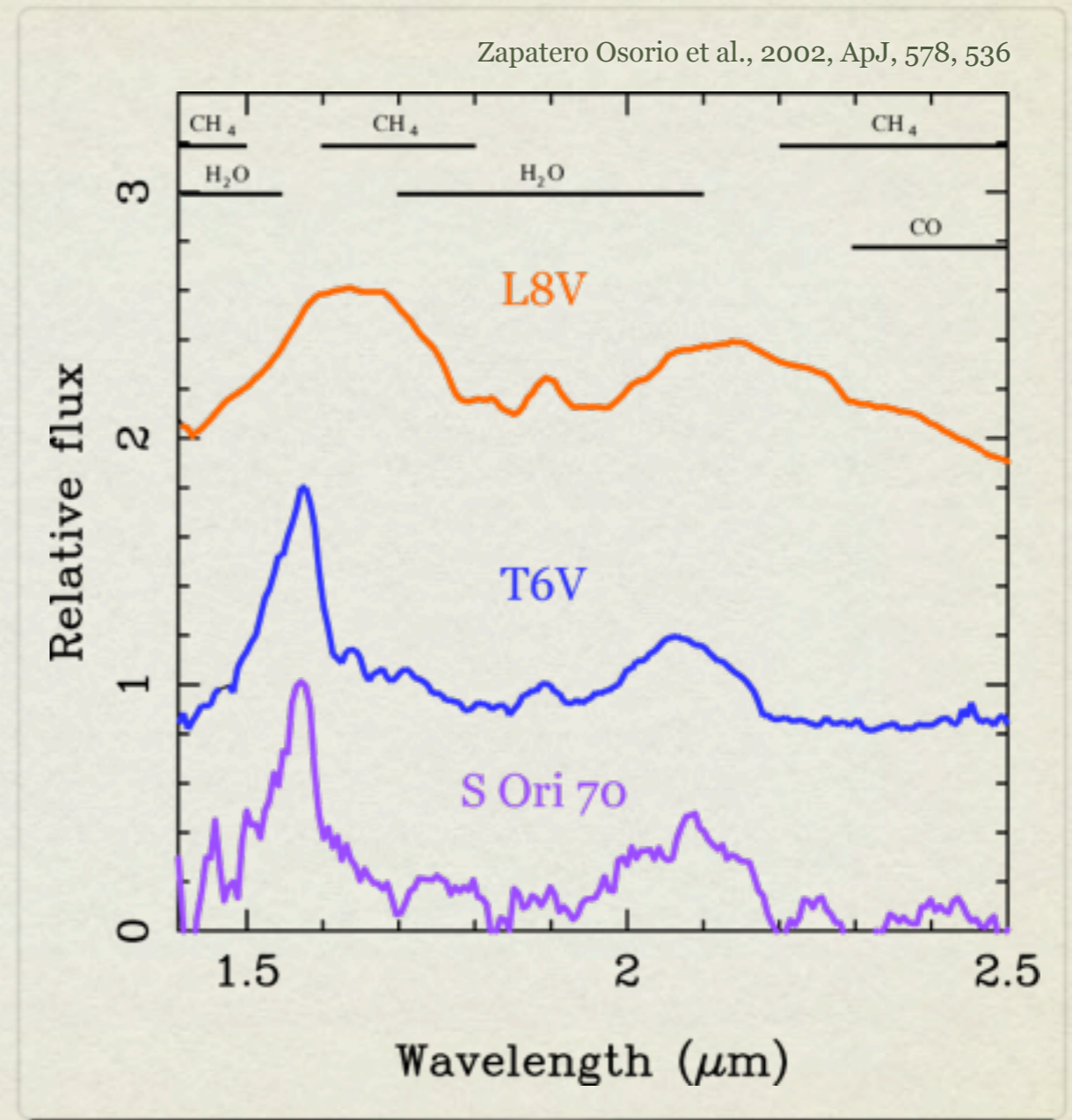
- Age: 3~5Myr
- Distance: 350pc
- 5 massive stars



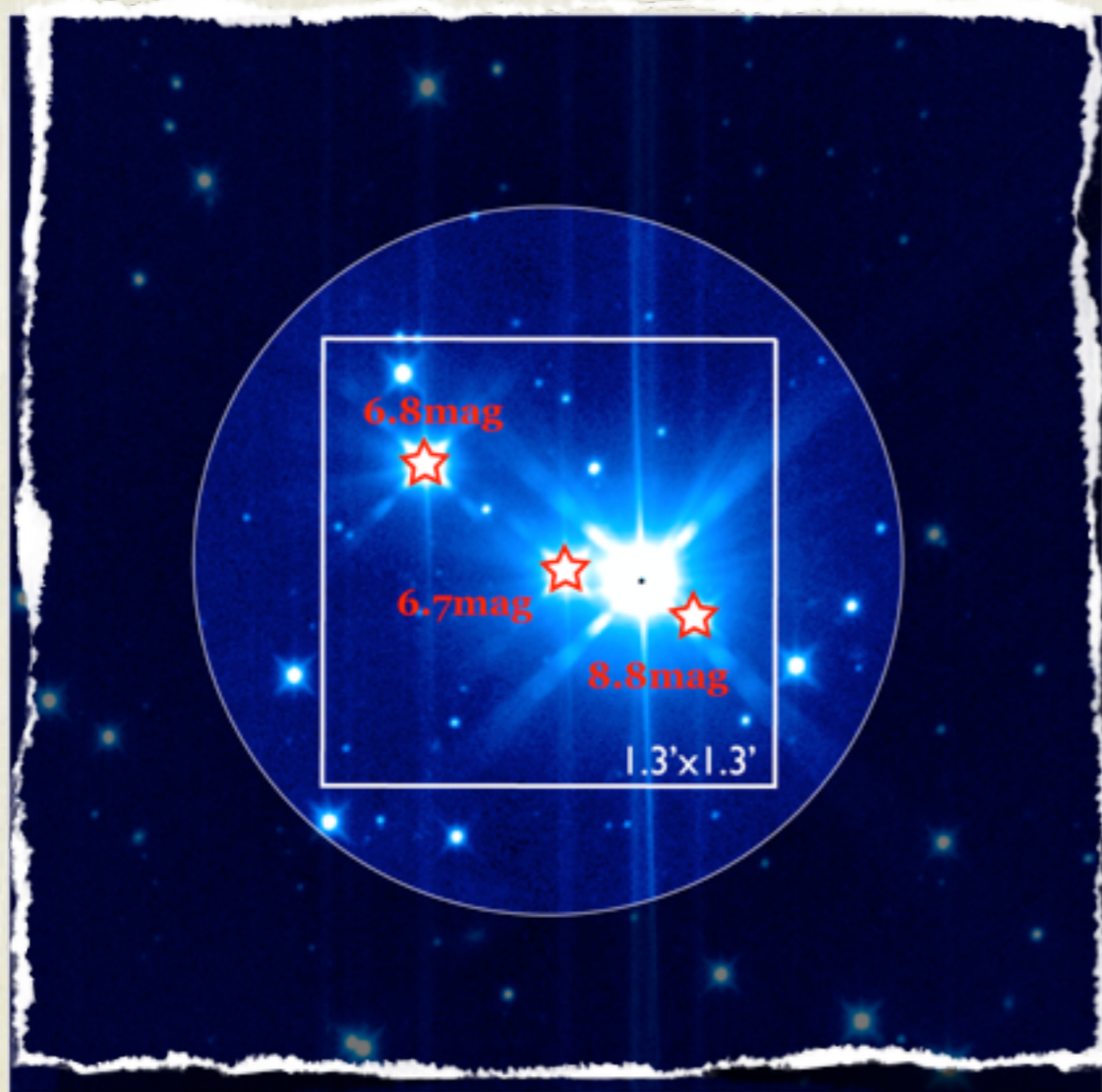
Credit: S. Guisard

σ -Orionis

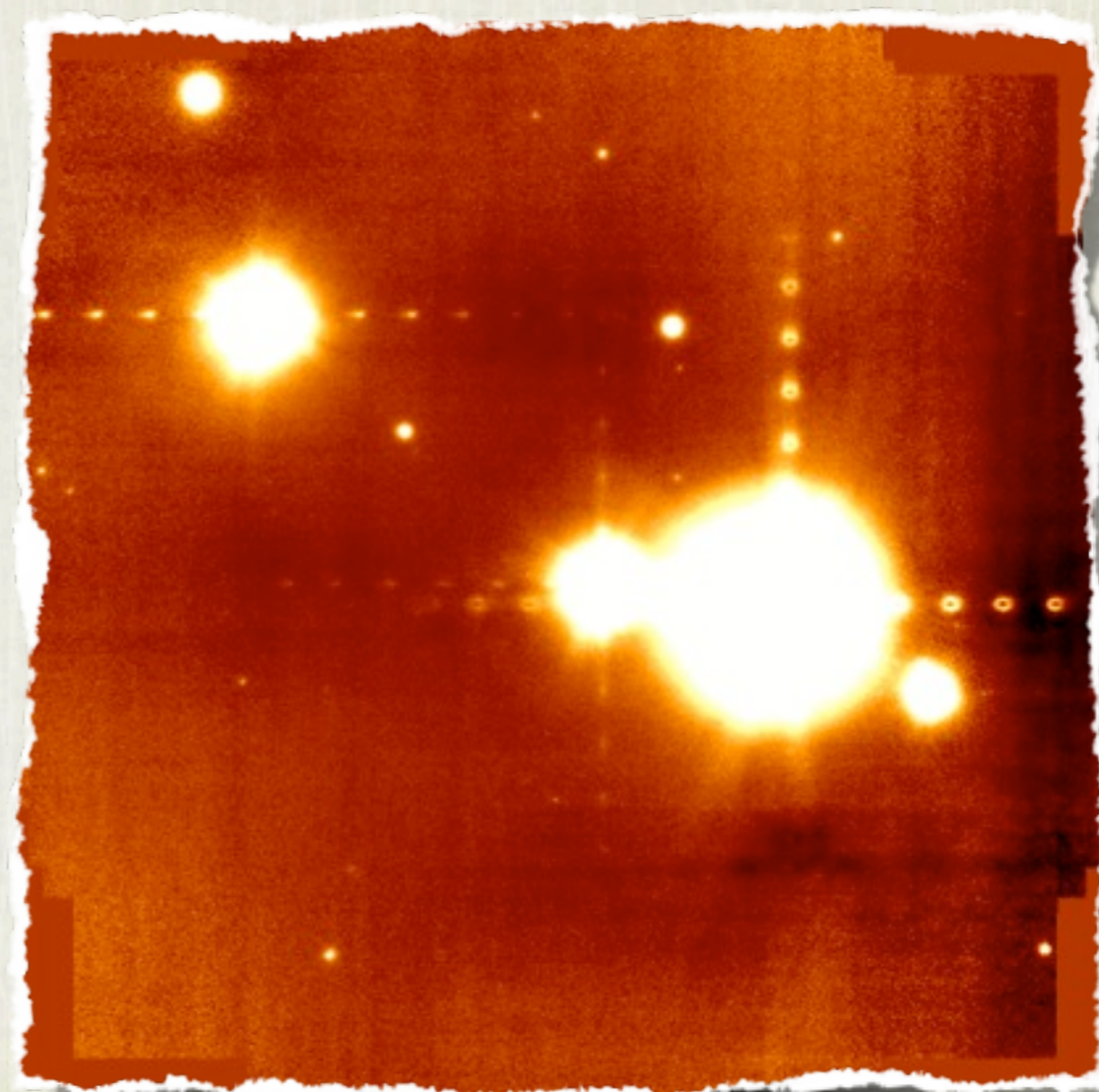
- Age: 3~5Myr
- Distance: 350pc
- 5 massive stars
- Several **isolated planetary mass objects**
- Extensively studied **except in its core**



MCAO field and ref. stars
(NTT/SofI Ks-image)



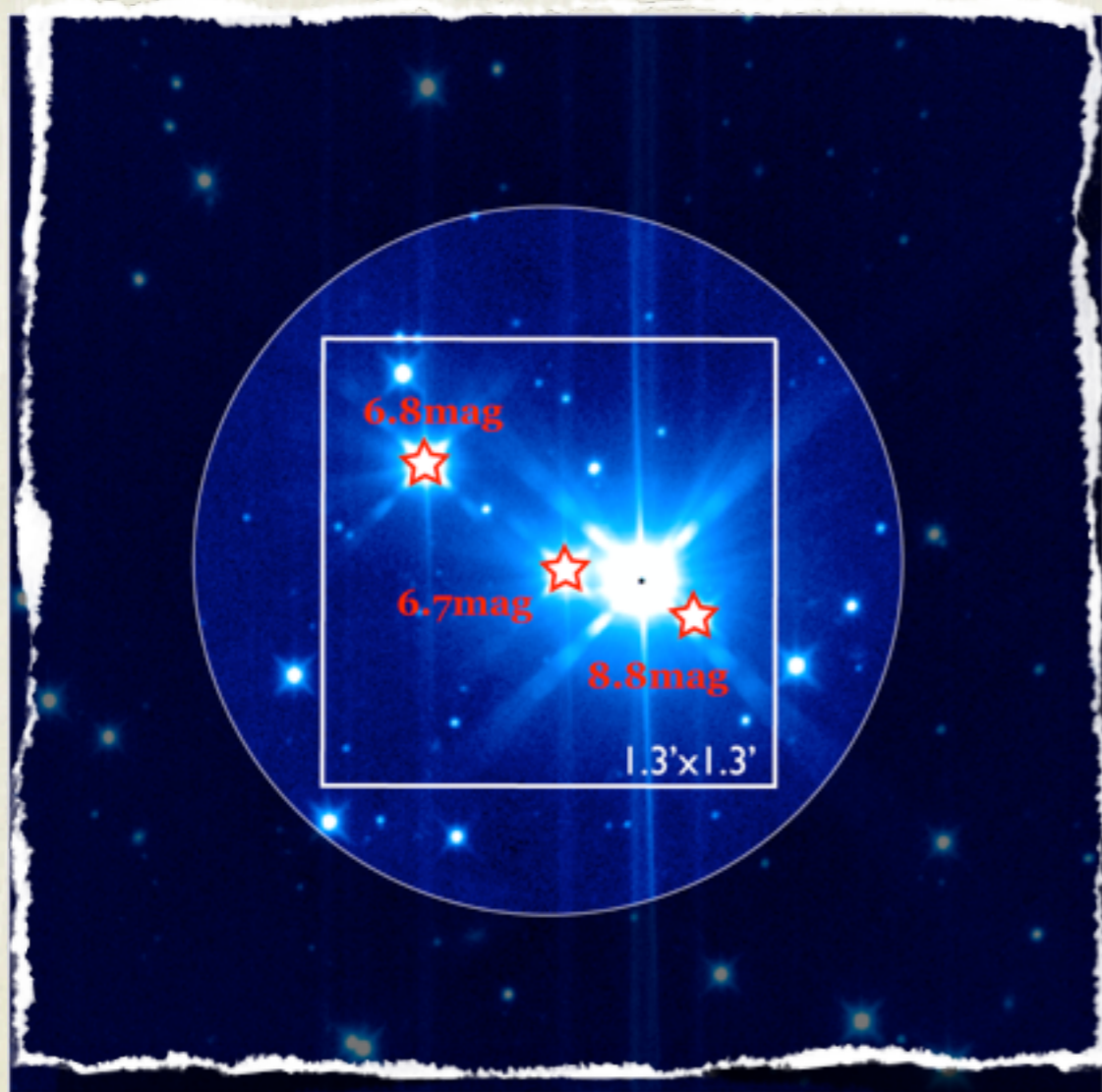
MAD Ks-image



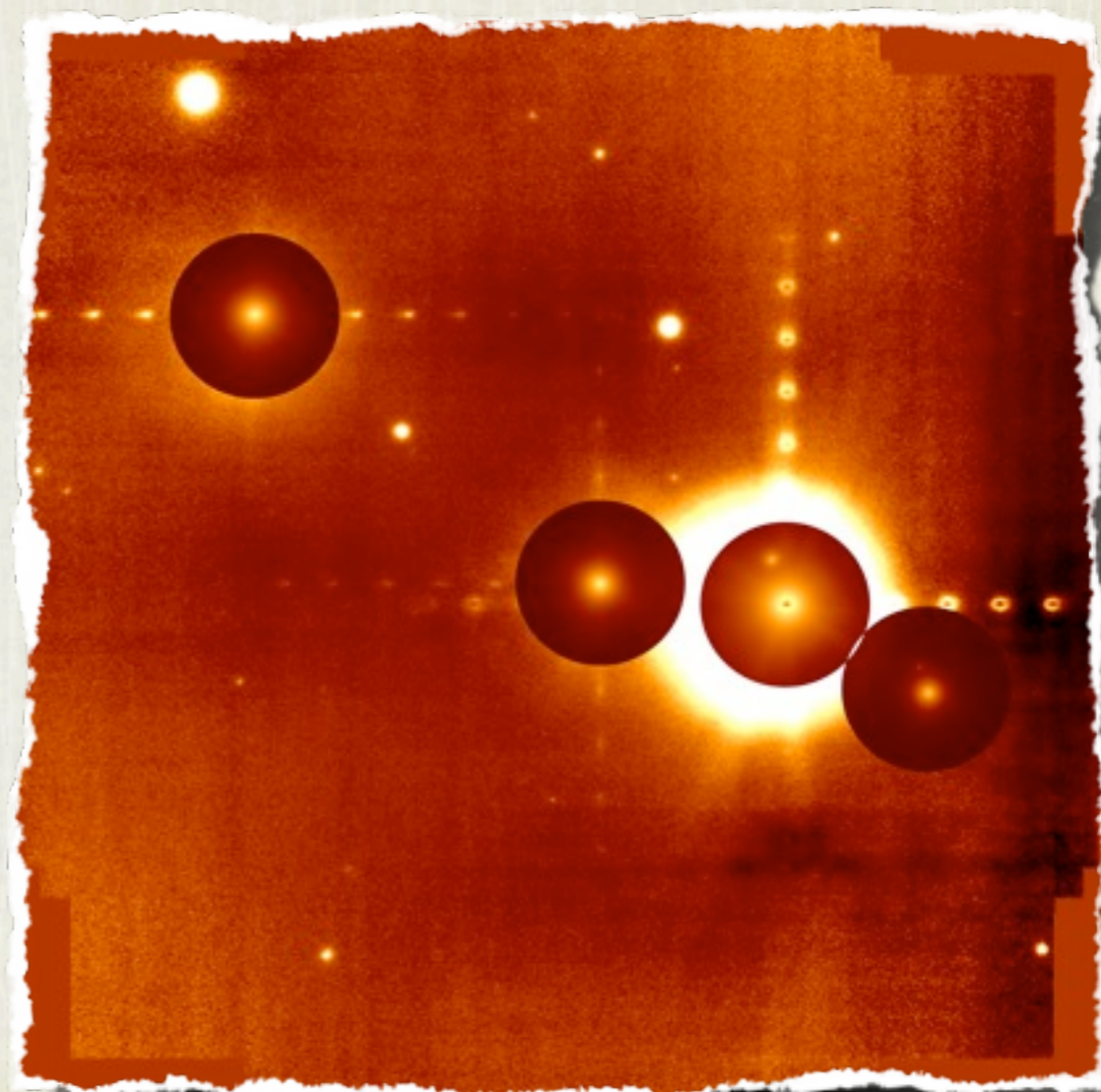
- ▶ Bright ref. stars
- ▶ but non-optimal configuration

- ▶ Strehl ratio 5~25%
- ▶ FWHM 0.09~0.14"
- ▶ 36 detections including 30 new sources

MCAO field and ref. stars
(NTT/SofI Ks-image)



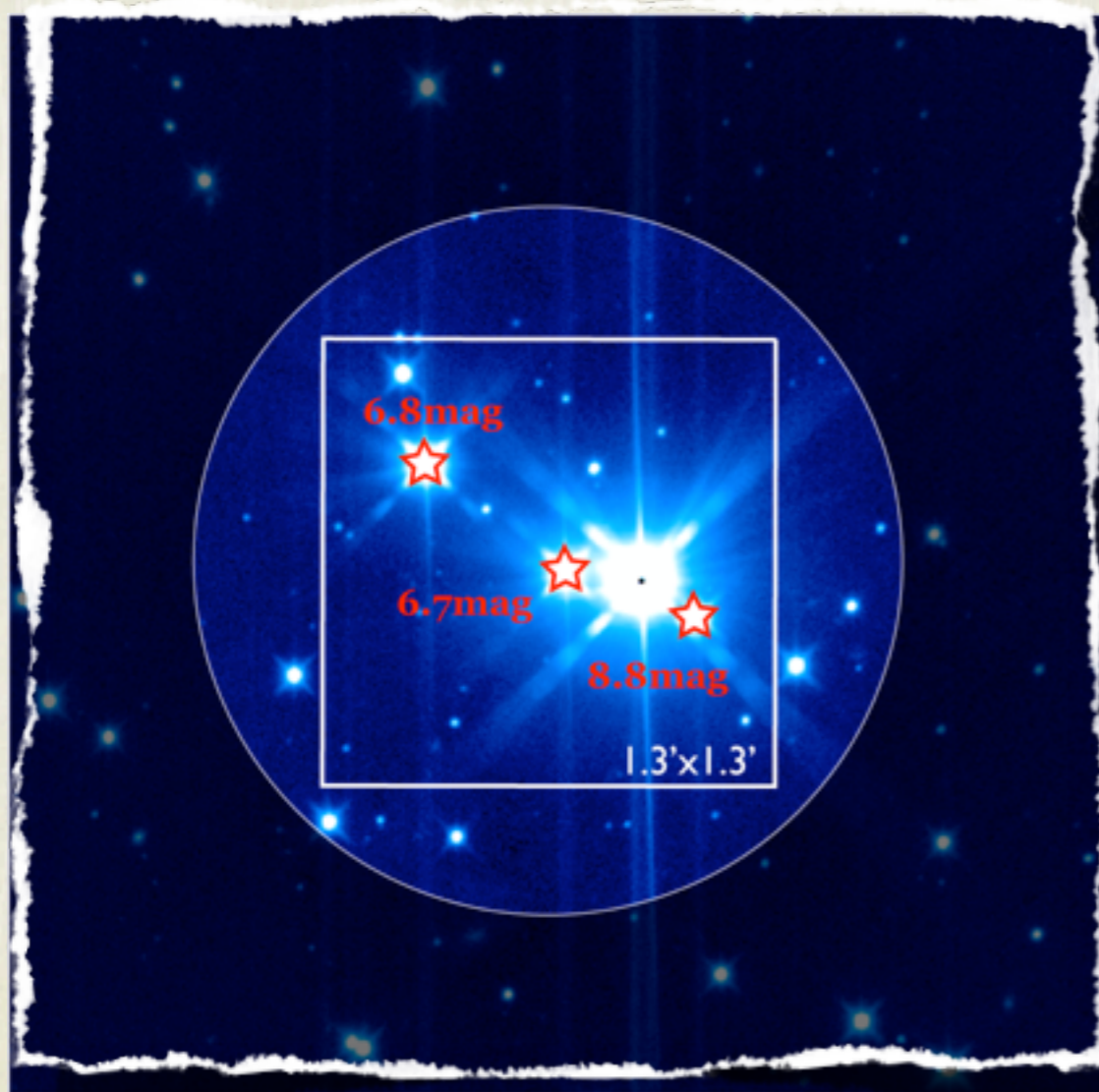
MAD Ks-image



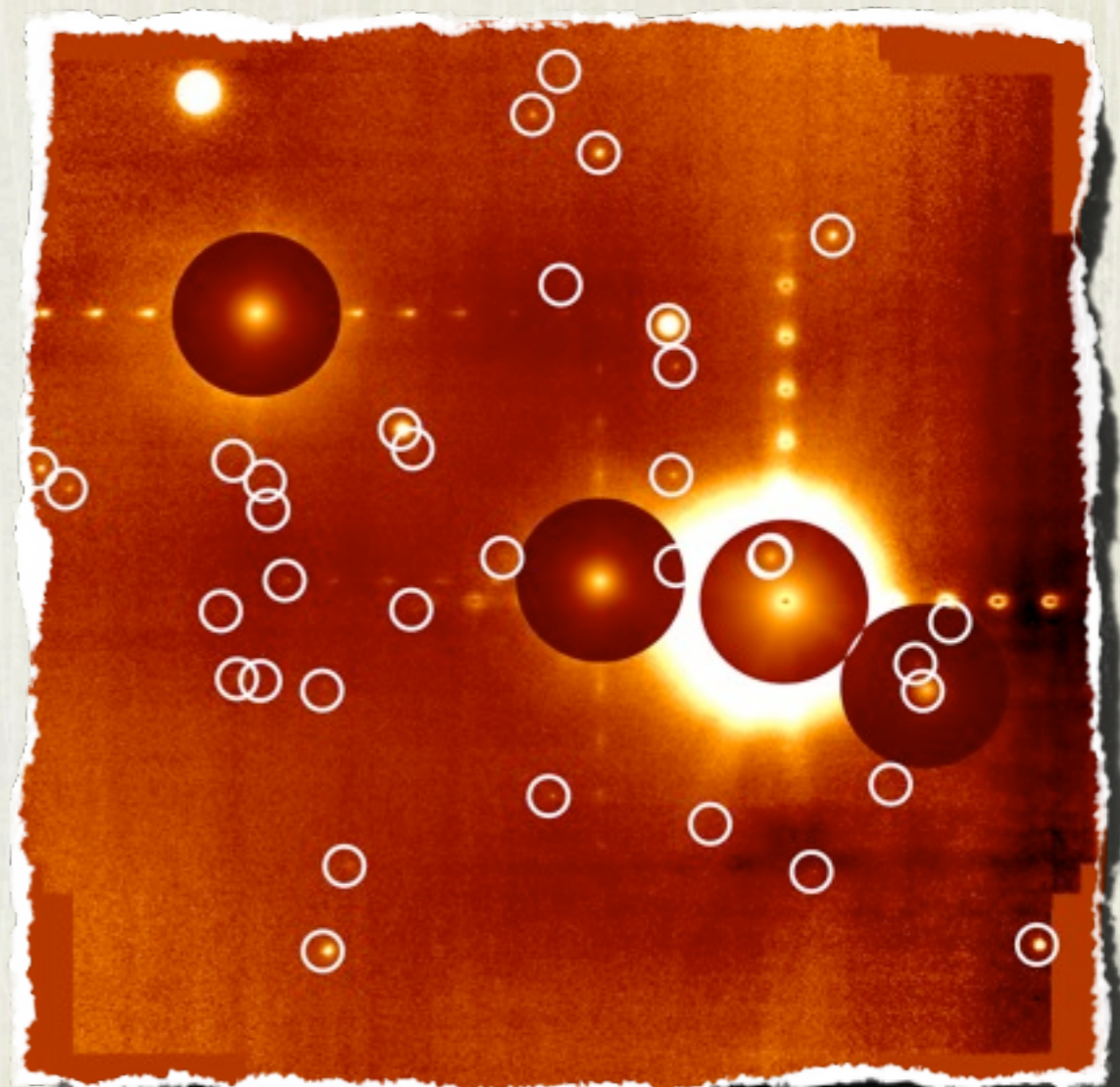
- ▶ Bright ref. stars
- ▶ but non-optimal configuration

- ▶ Strehl ratio 5~25%
- ▶ FWHM 0.09~0.14"
- ▶ 36 detections including 30 new sources

MCAO field and ref. stars
(NTT/SofI Ks-image)



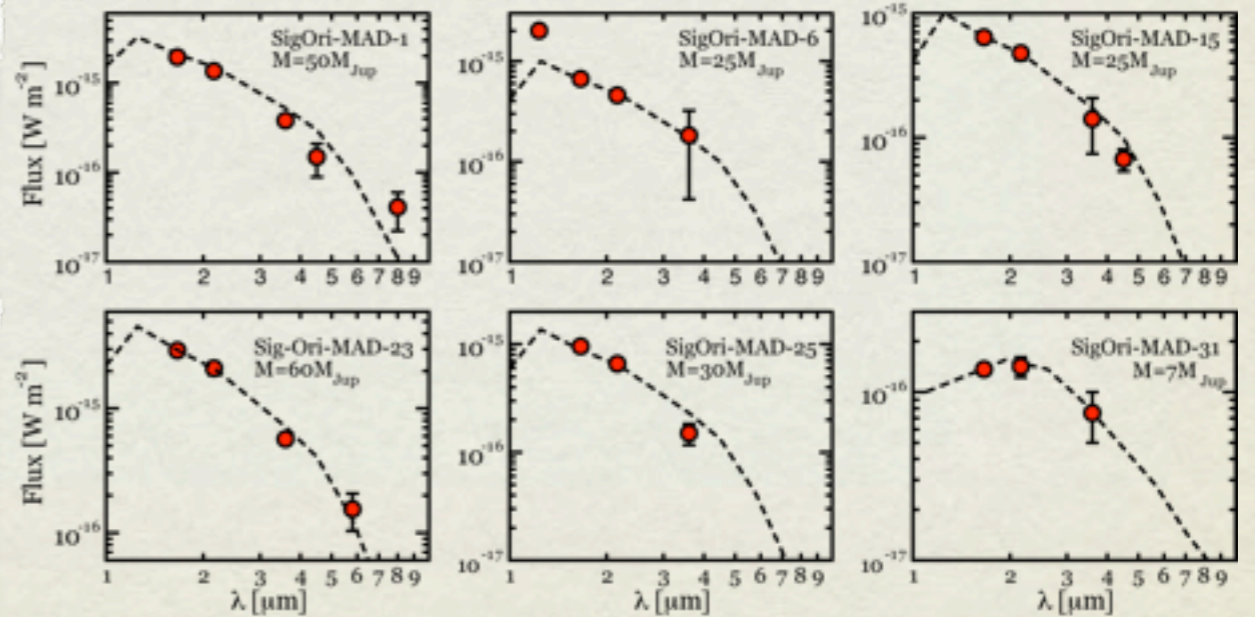
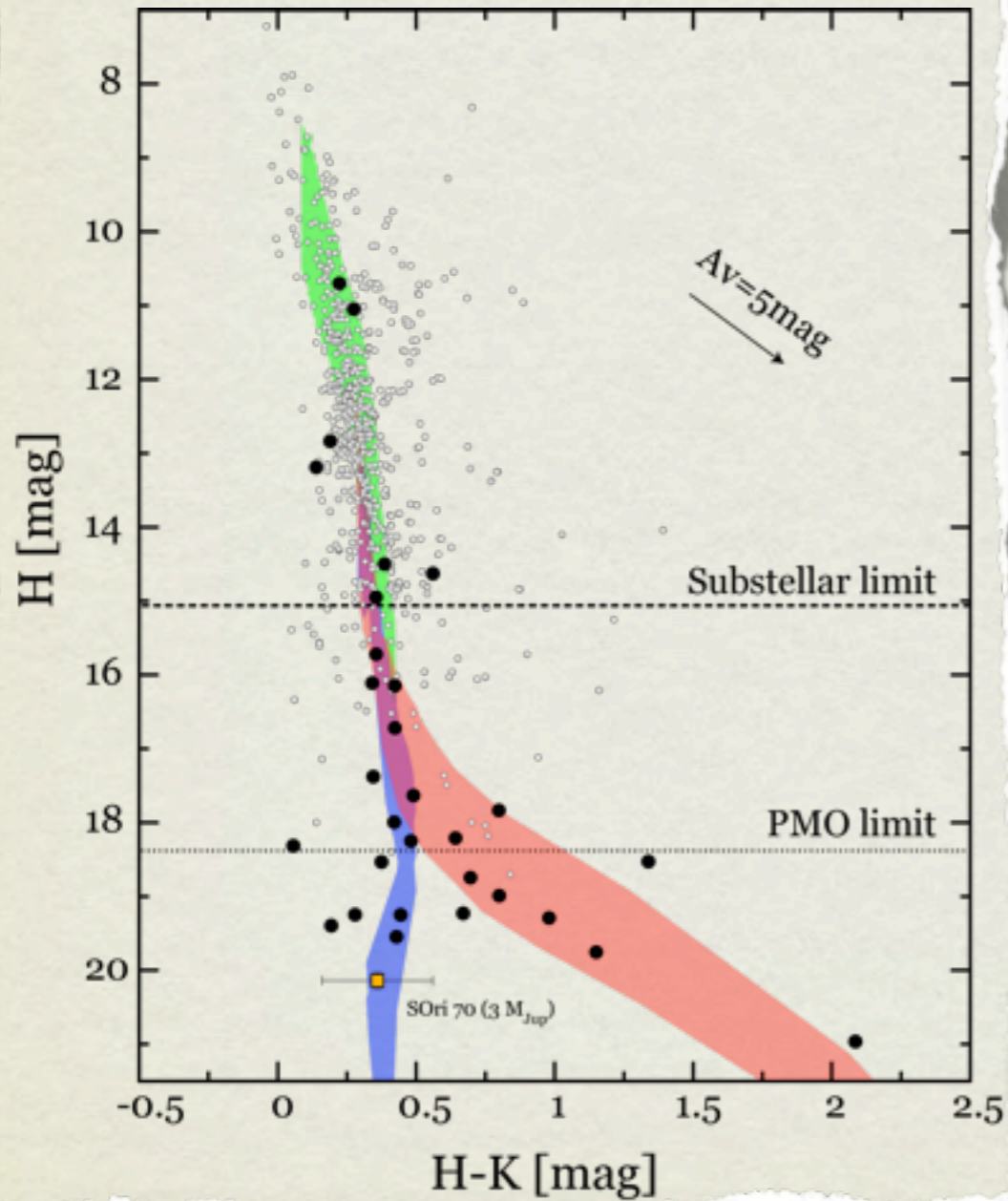
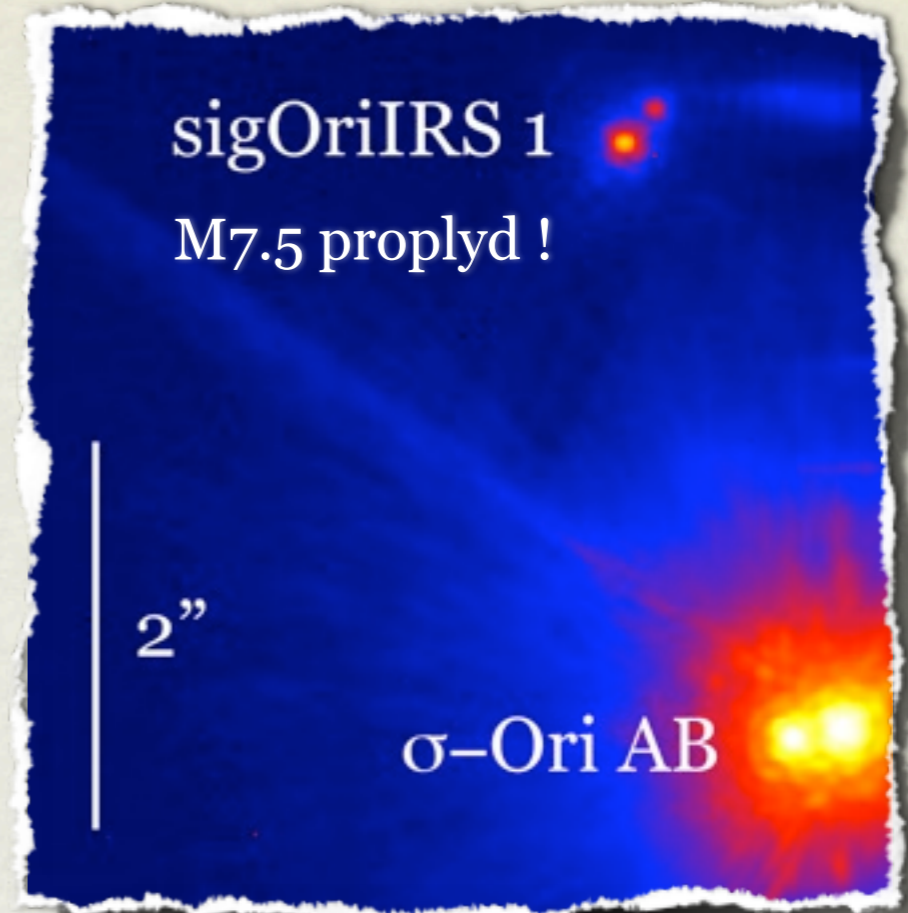
MAD Ks-image



- ▶ Bright ref. stars
- ▶ but non-optimal configuration

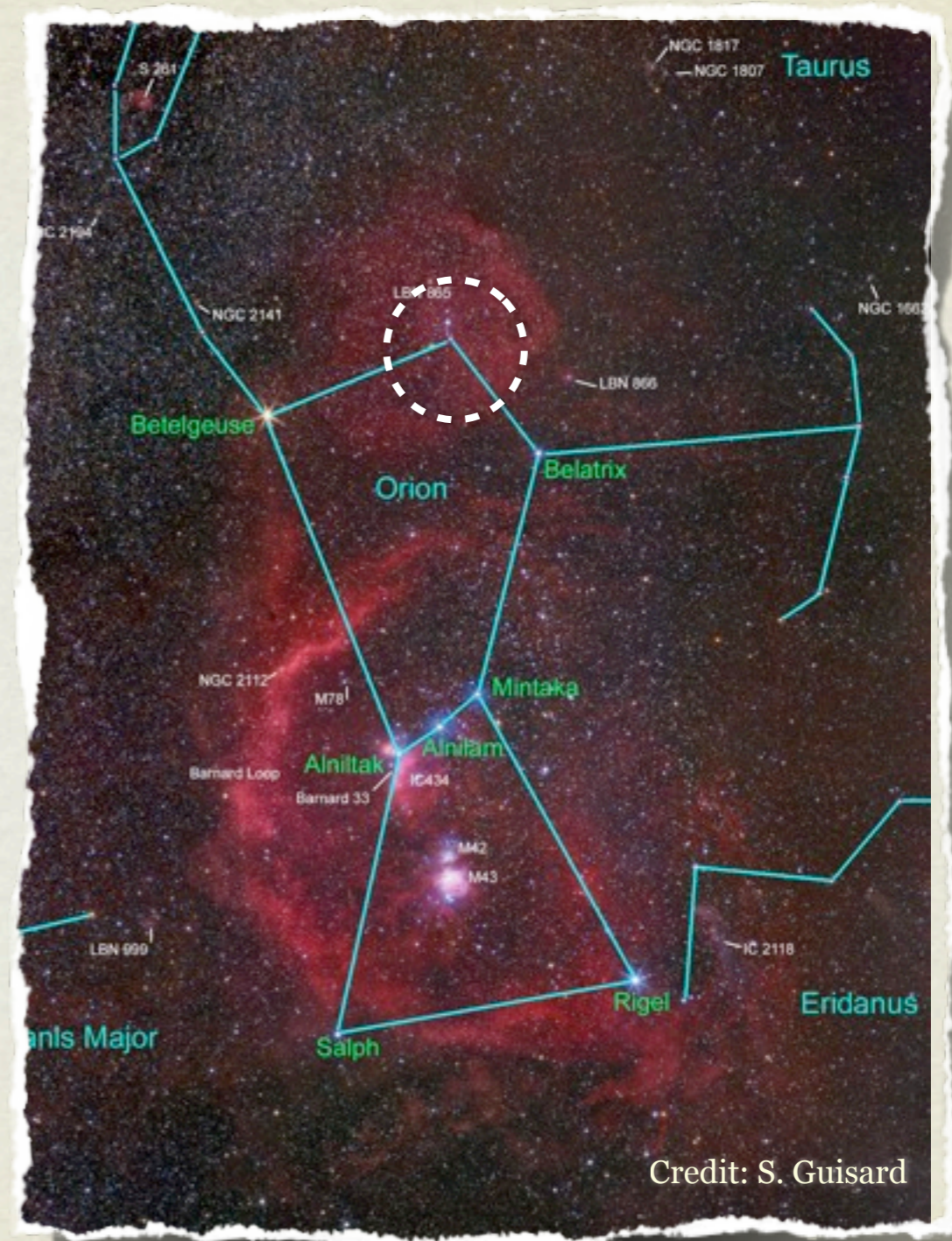
- ▶ Strehl ratio 5~25%
- ▶ FWHM 0.09~0.14"
- ▶ 36 detections including 30 new sources

a few scientific highlights ...



Collinder 69

- Age: 2~5Myr
- Distance: 400pc
- Located in the λ -Orionis star forming region



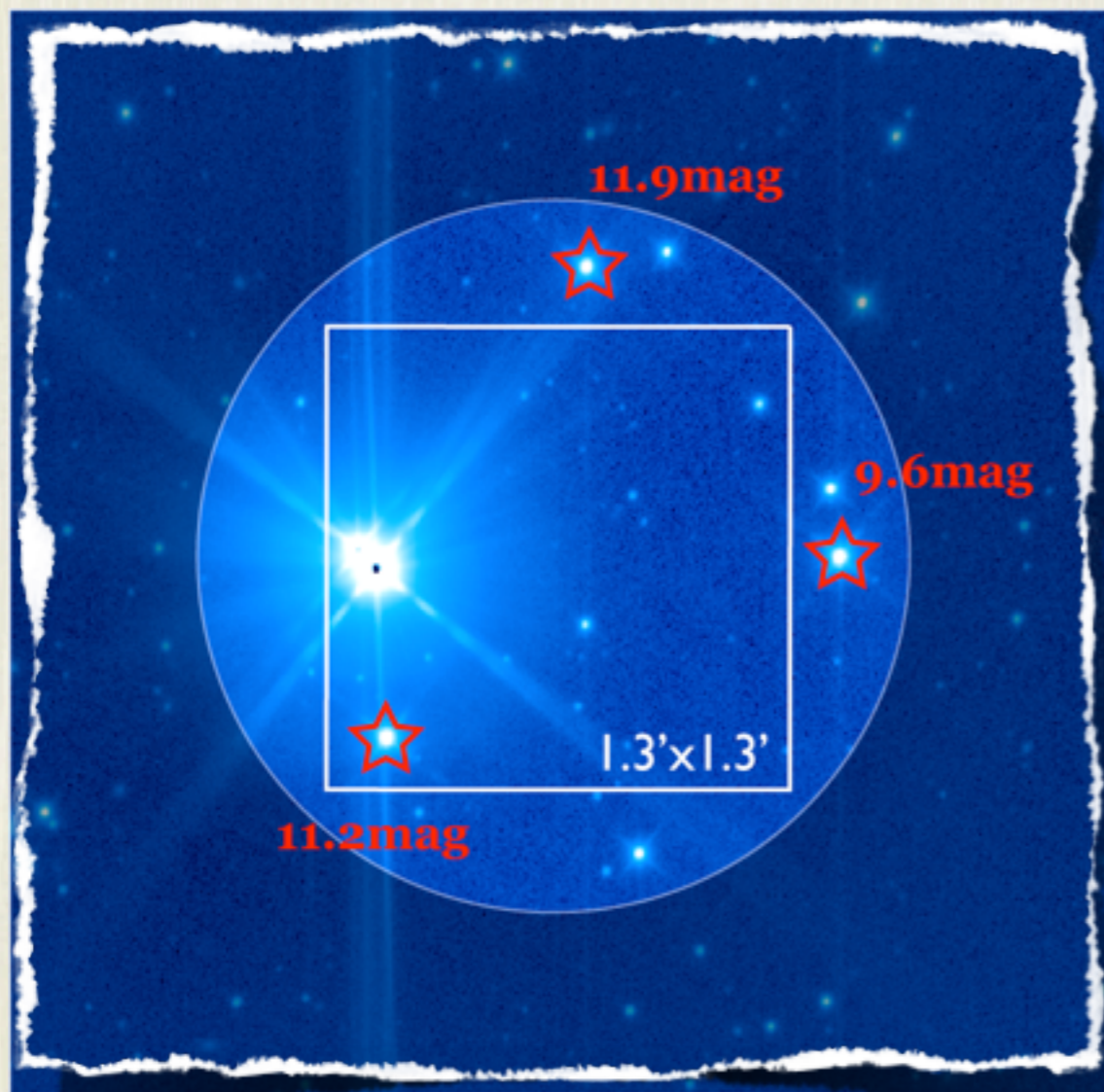
Collinder 69

- Age: 2~5Myr
- Distance: 400pc
- Located in the λ -Orionis star forming region
- Only 2 massive stars
- Numerous very low mass stars, brown dwarfs and planetary mass members

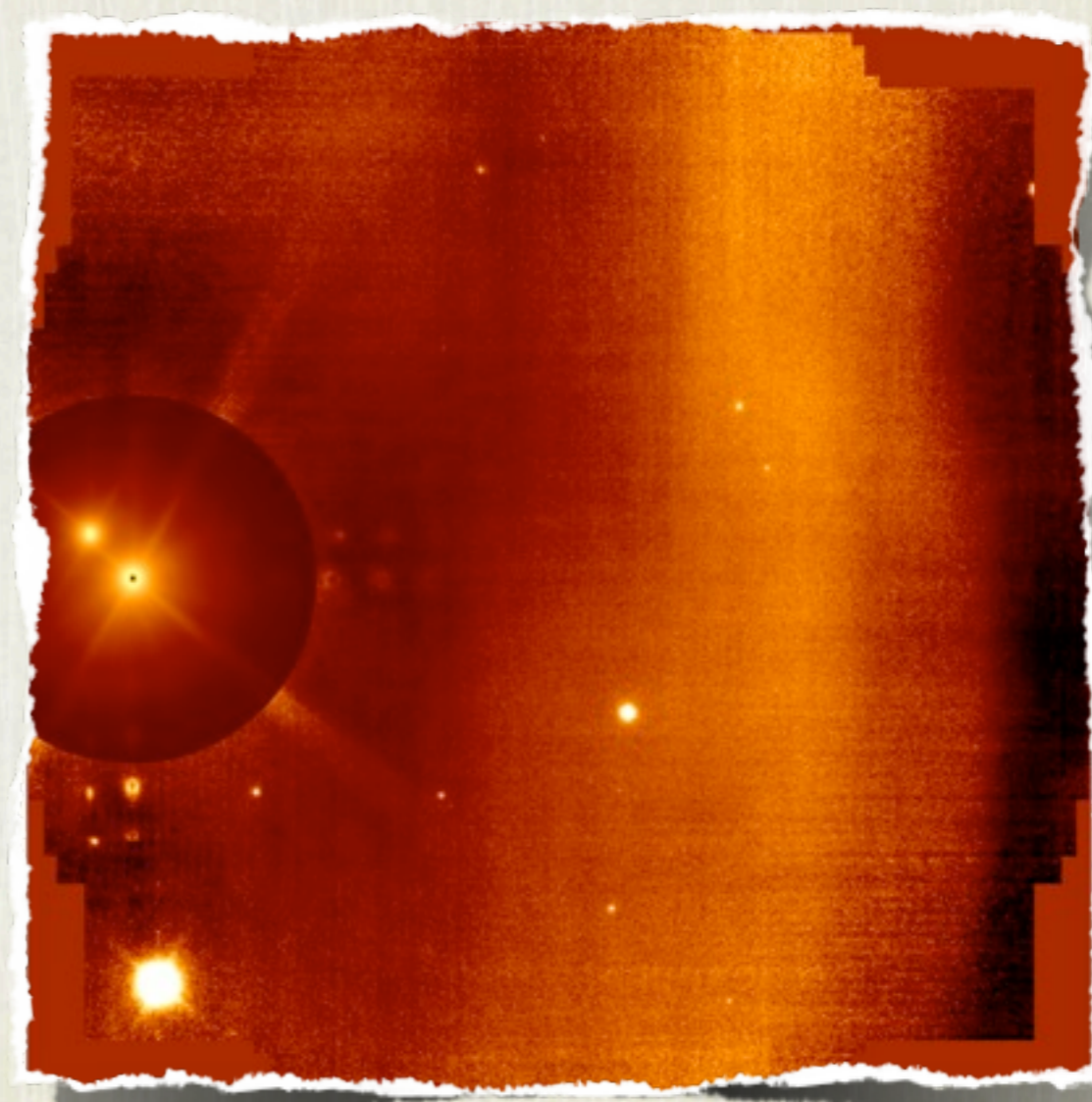


Credit: D. Barrado y Navacué

MCAO field and ref. stars
(NTT/SofI Ks-image)



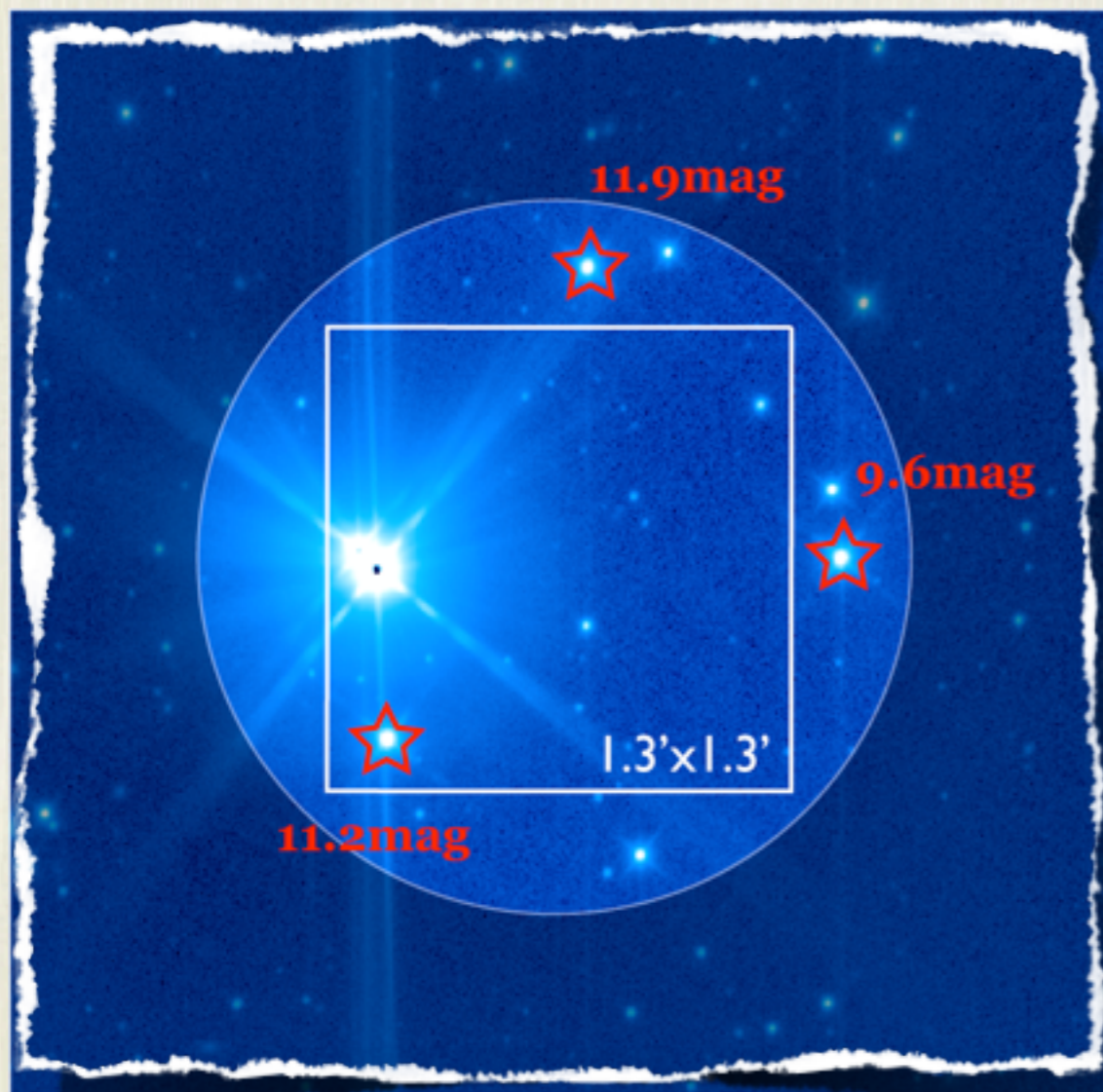
MAD Ks-image



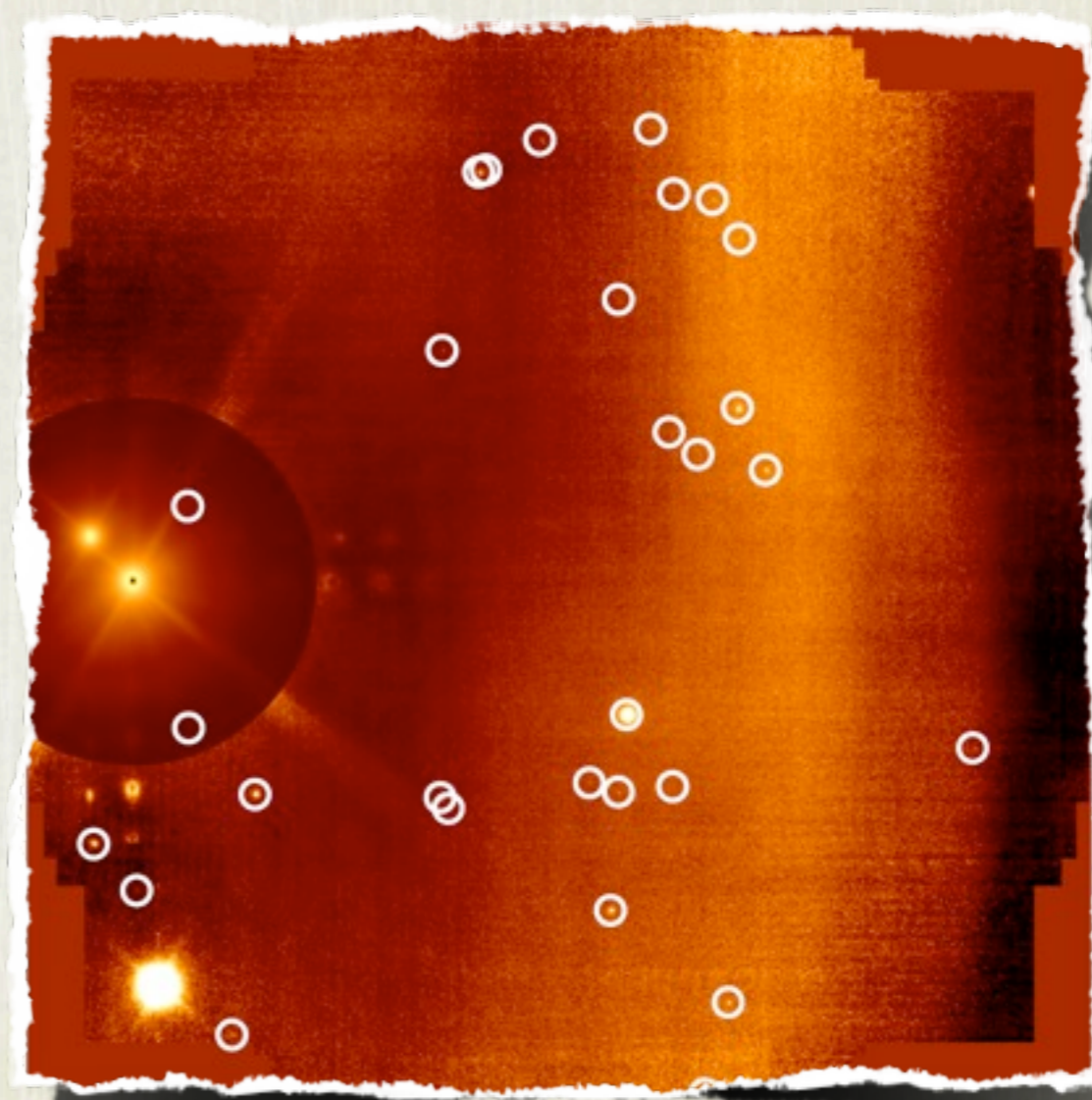
- ▶ Nice regular geometry
- ▶ but faint AO ref. stars

- ▶ Strehl ratio 5~25%
- ▶ FWHM 0.09~0.12"
- ▶ 32 detections including 30 new sources

MCAO field and ref. stars
(NTT/SofI Ks-image)

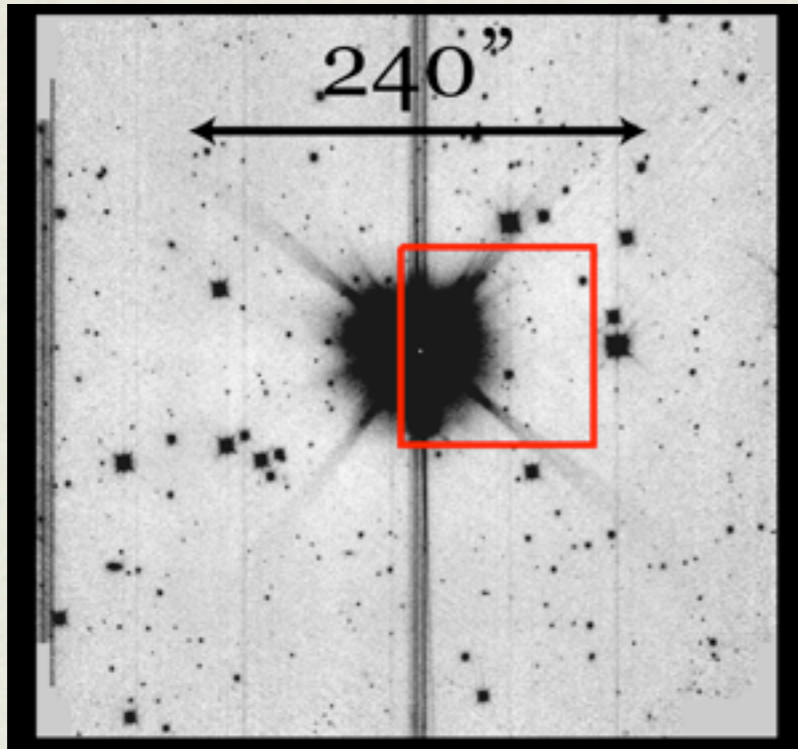


MAD Ks-image



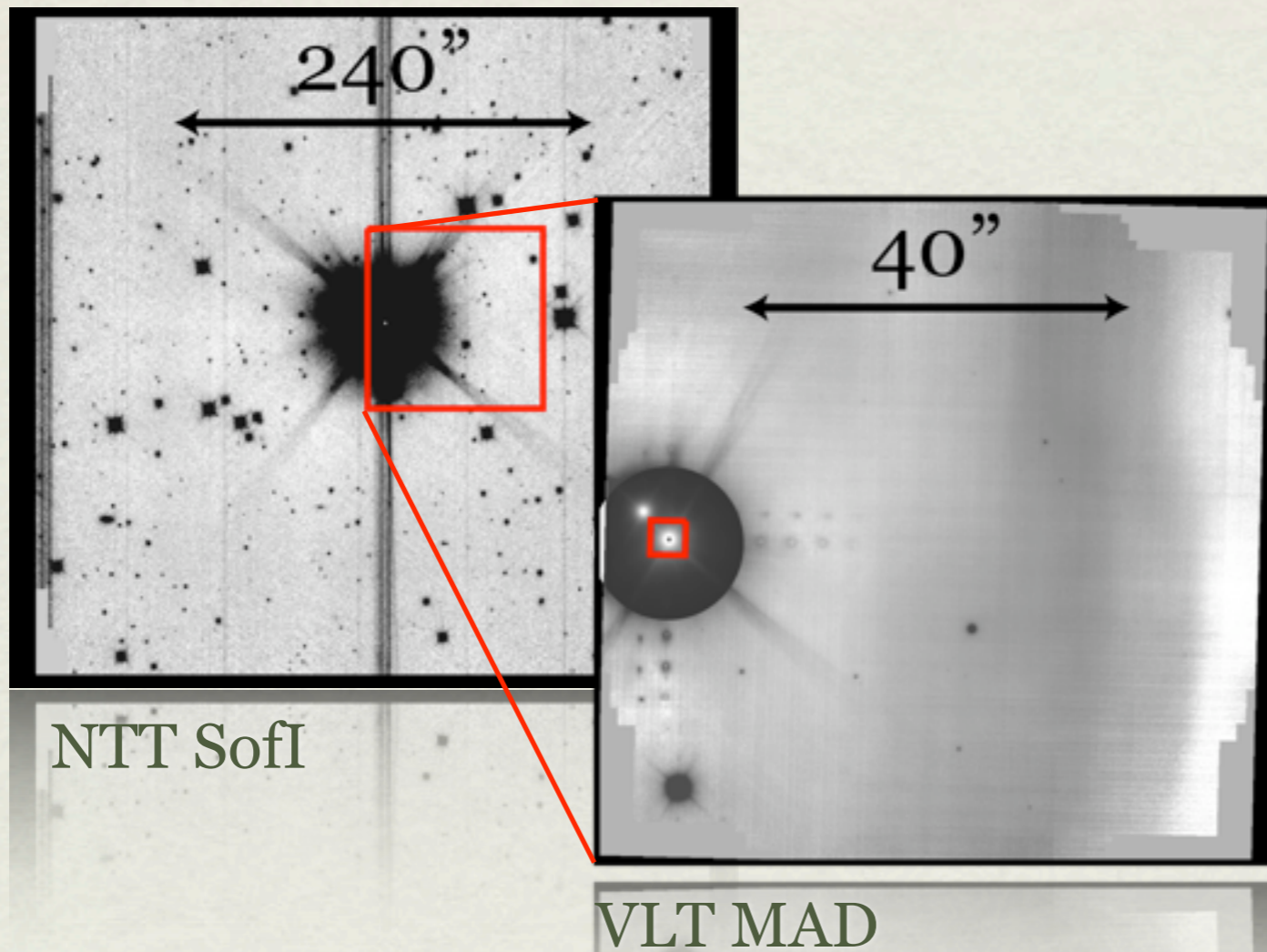
- ▶ Nice regular geometry
- ▶ but faint AO ref. stars

- ▶ Strehl ratio 5~25%
- ▶ FWHM 0.09~0.12''
- ▶ 32 detections including 30 new sources

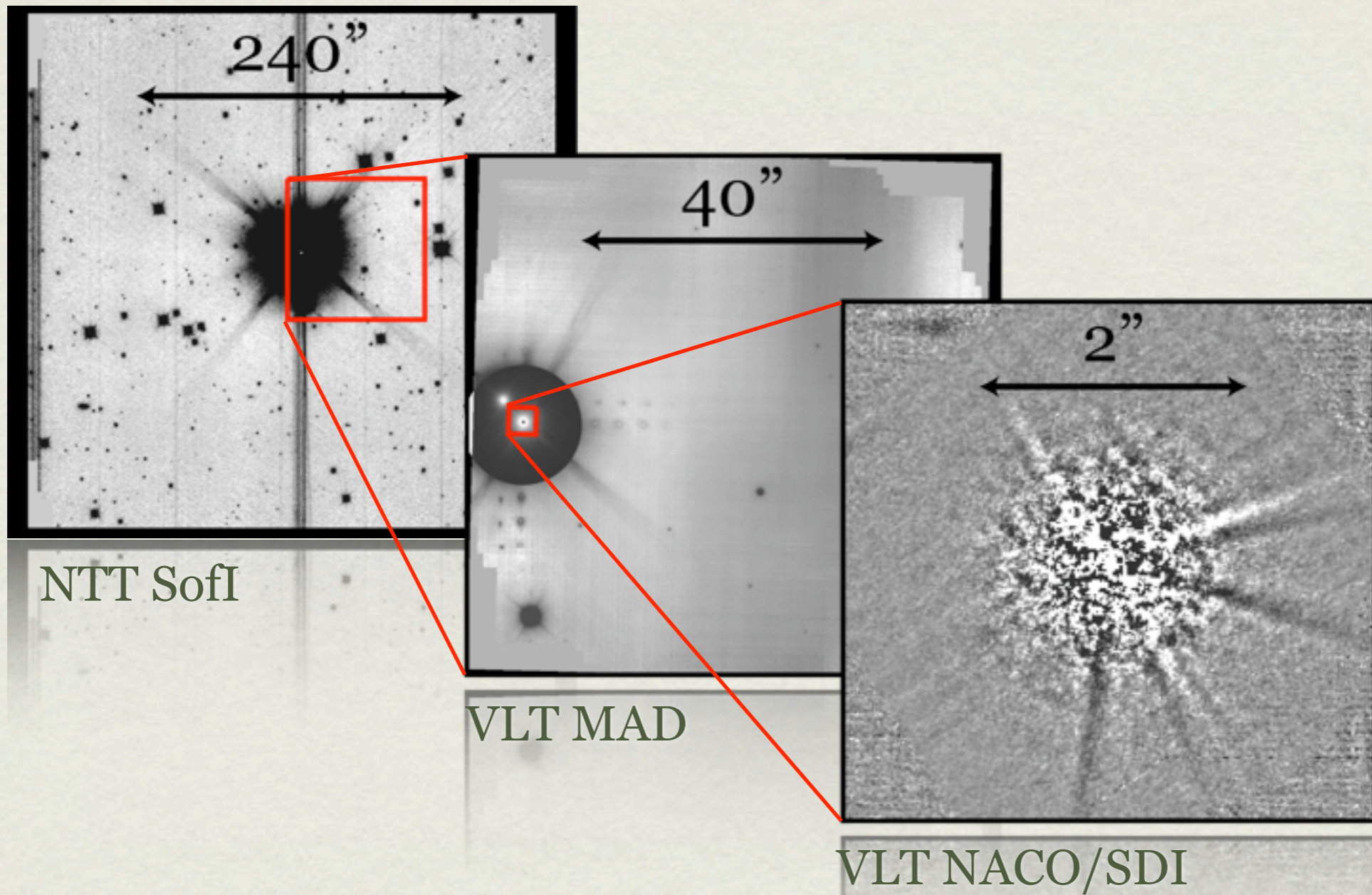


NTT SofI

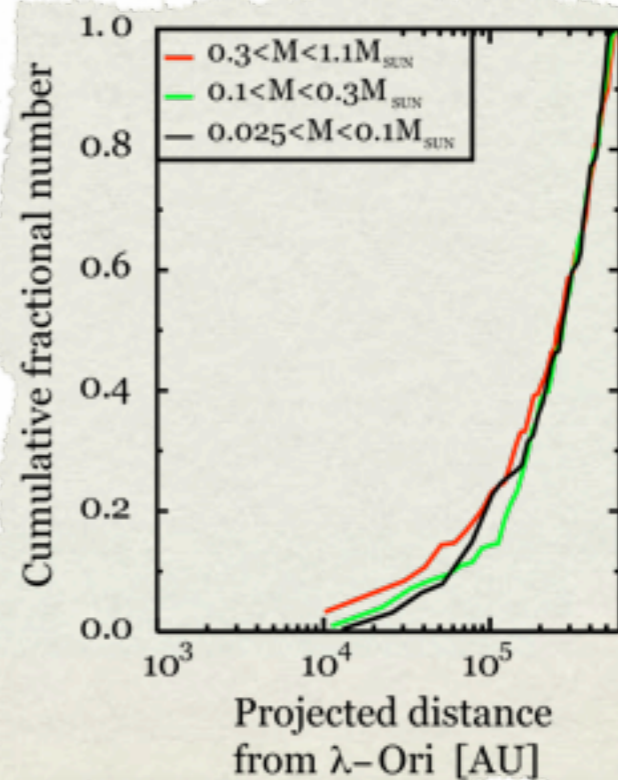
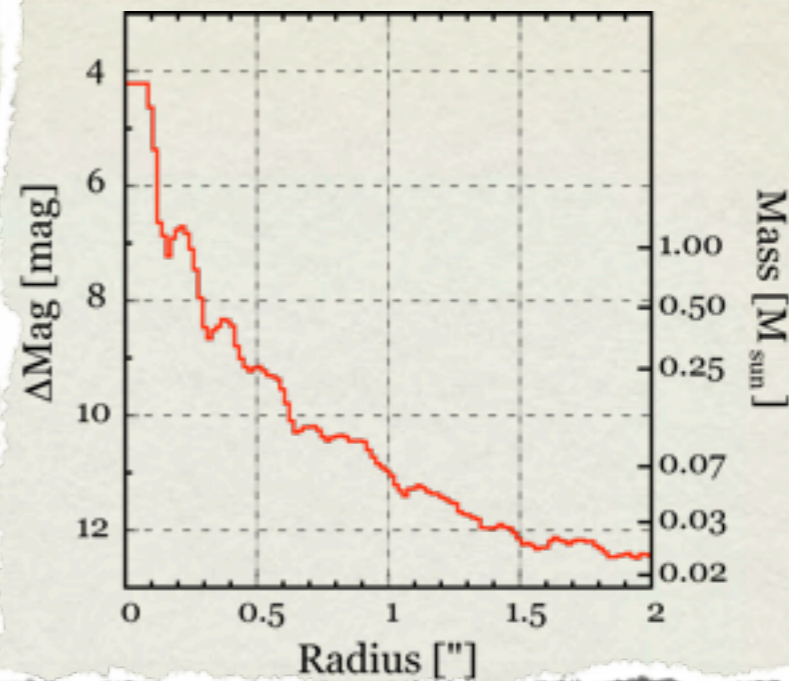
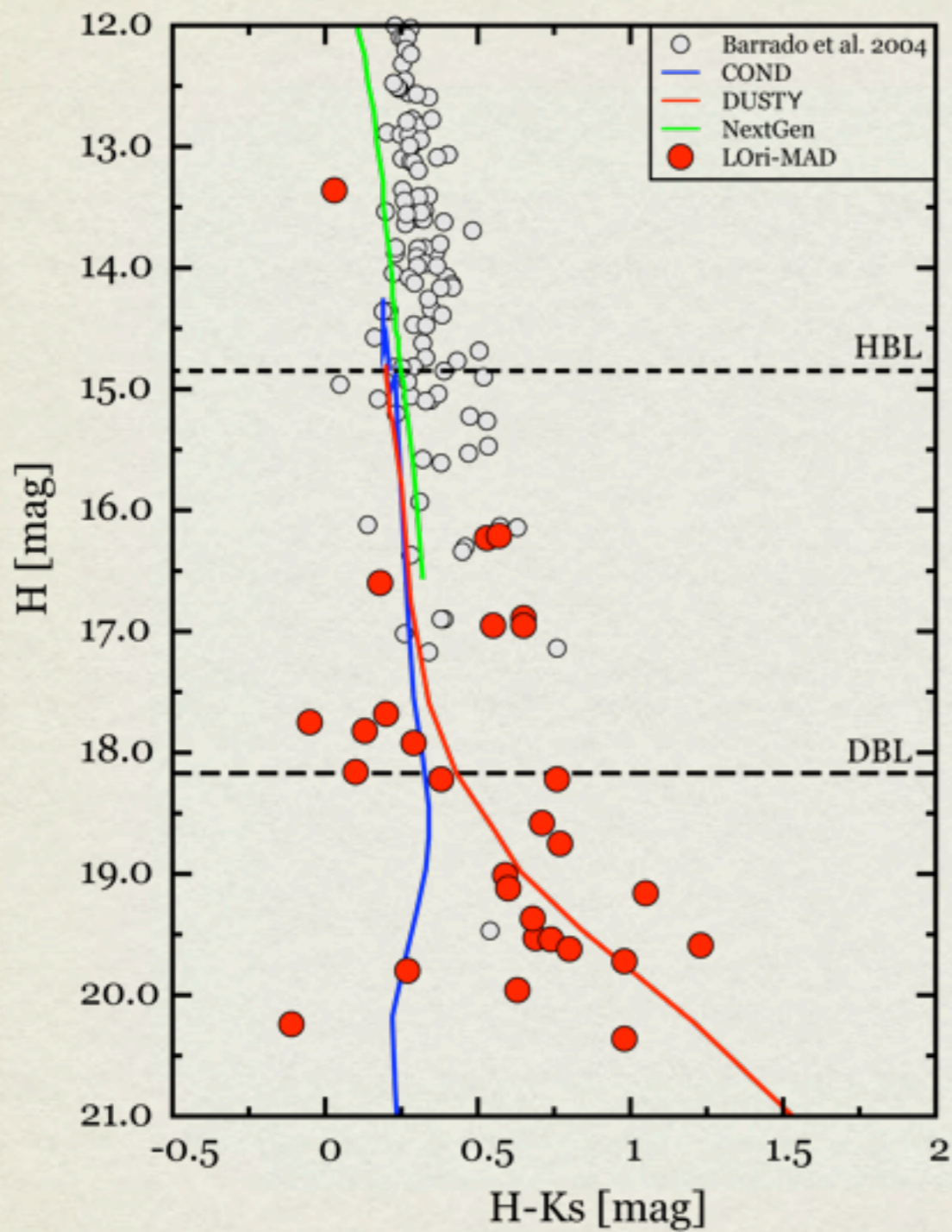
A multi-spatial scale
study of Collinder 69



A multi-spatial scale
study of Collinder 69

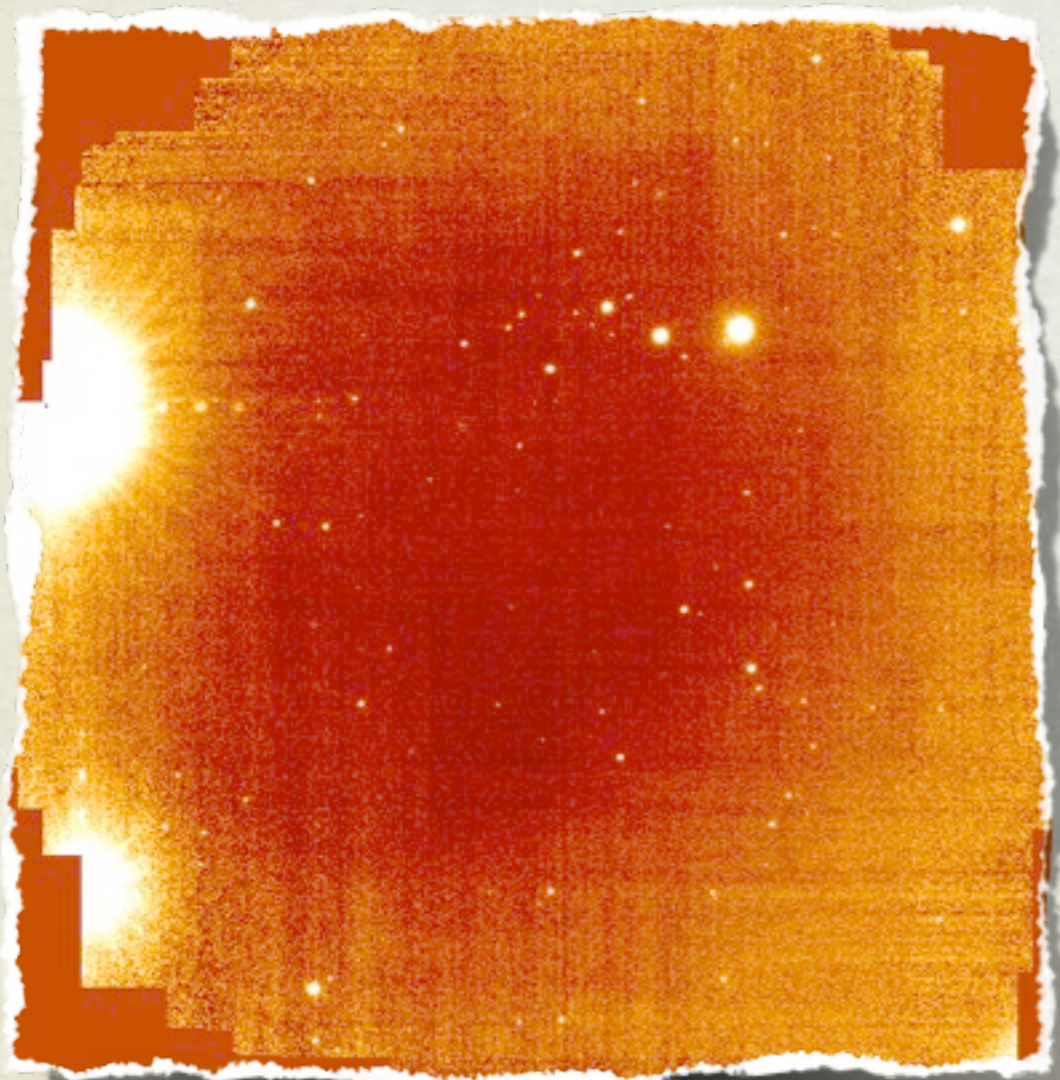


A multi-spatial scale
study of Collinder 69

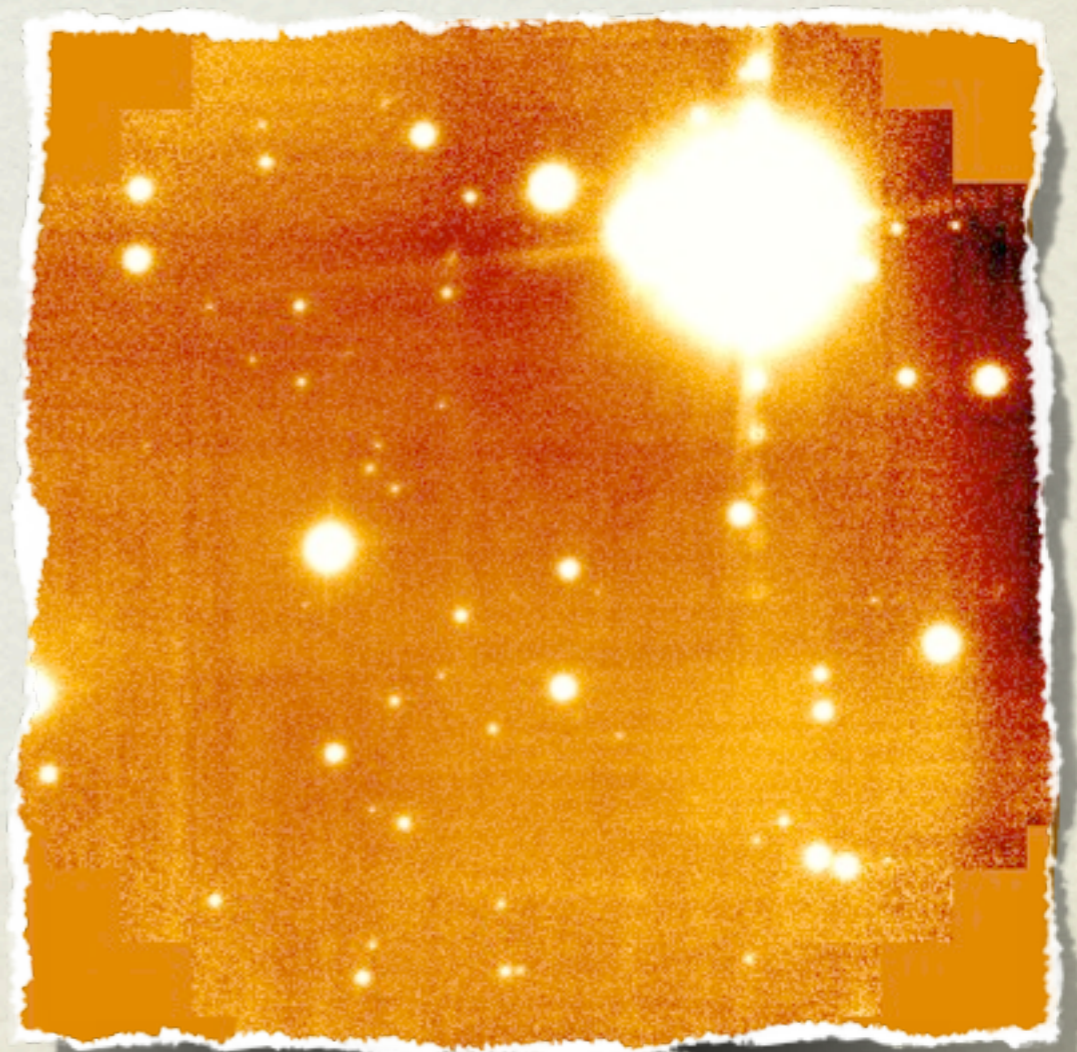


On-going work...

Lupus (200pc)
1.7'x1.7'



NGC2362 (2kpc)
1.2'x1.2'



and perspectives...



RCrA- Credit *Spitzer*/L. Allen



Serpens - Credit ESO *HAWK-I* team



Perseus - Credit *Spitzer* / c2d

ρ -Oph - Credit *Spitzer* / c2d