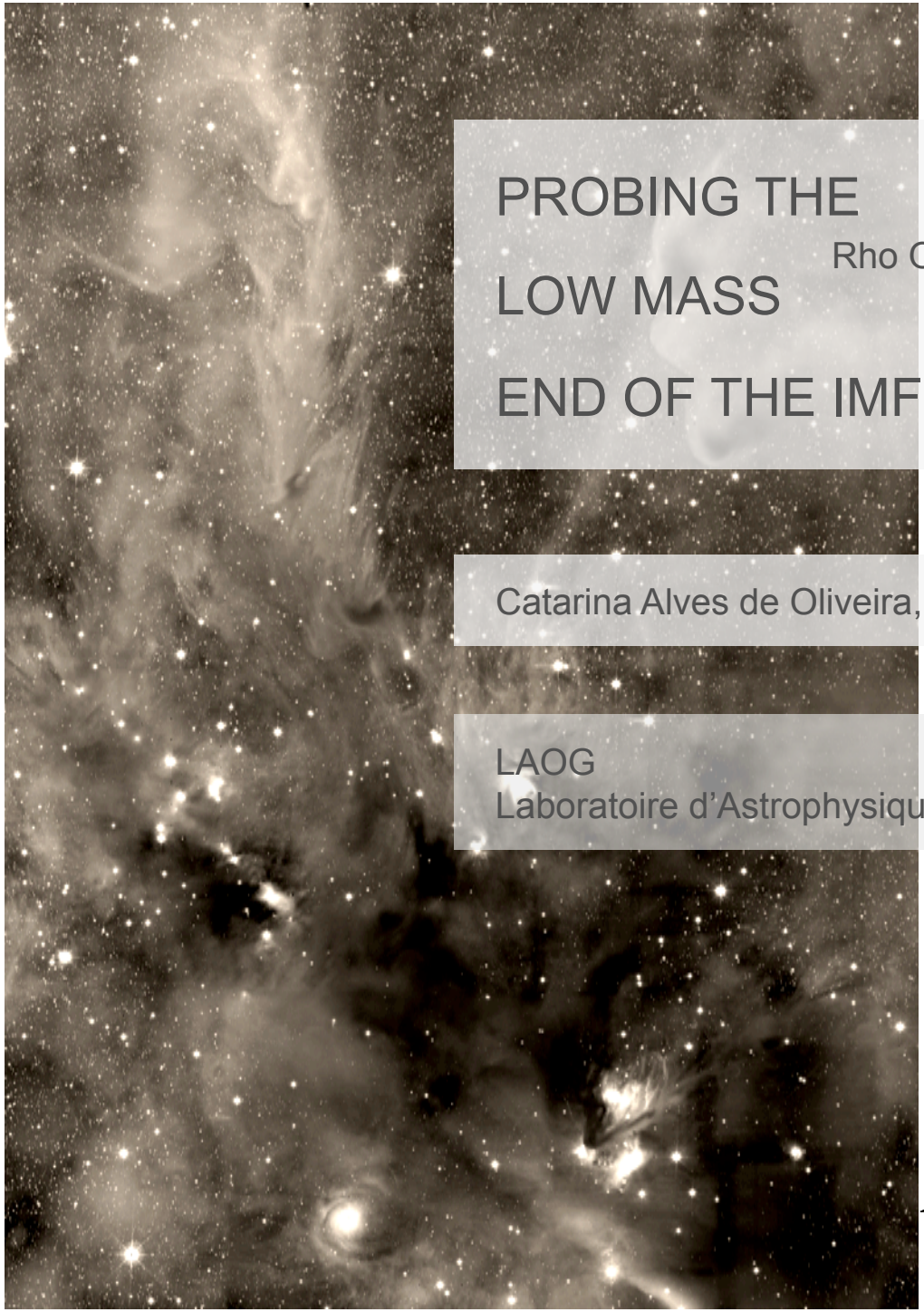


PROBING THE LOW MASS END OF THE IMF

Rho Ophiuchus Molecular Cloud

Catarina Alves de Oliveira, Jerome Bouvier, Estelle Moraux

LAOG
Laboratoire d'Astrophysique de Grenoble

Observational Projects

The physics of the low mass end of the IMF

Imaging surveys

Spectroscopic follow-up

CHARACTERIZATION OF THE YOUNG STELLAR POPULATION OF ρ Oph down to the planetary mass regime, using multi-wavelength photometric and spectroscopic surveys

Pre-stellar cores

Kinematics

Disks

Multiplicity

X-ray

CFHT

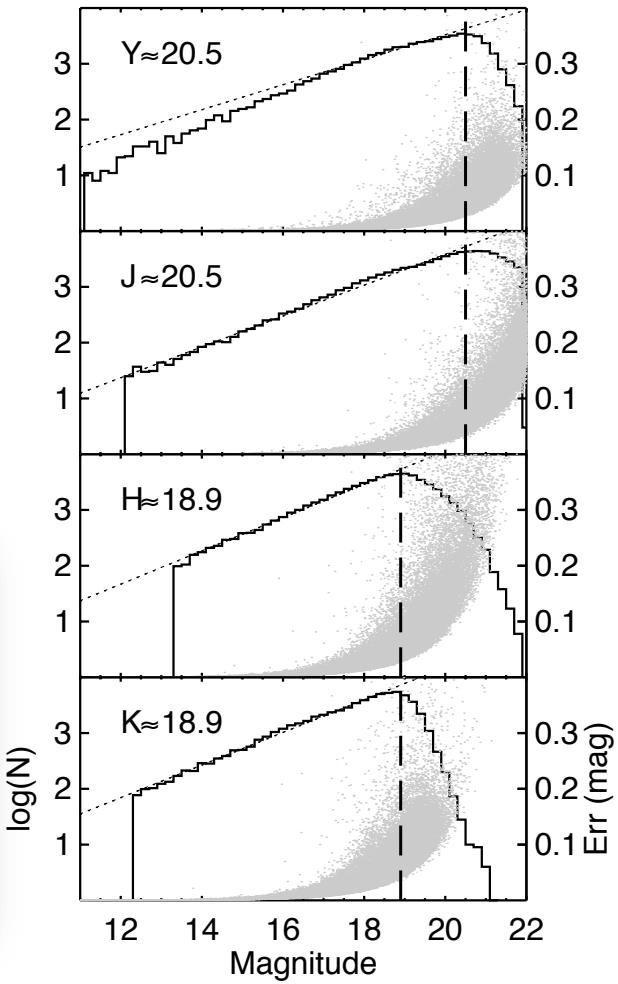
WIRCAM/CFHT large program: deep YJHKs survey ~ 1 deg^2

ρ Oph :
~1Myr
~300 members
d~120-140pc

Reductions

Completeness: J ~ 20.5 and H, K ~18.9 (with errors of ≤ 0.1mag)

Recover all known members, except objects in confused regions



CMDs

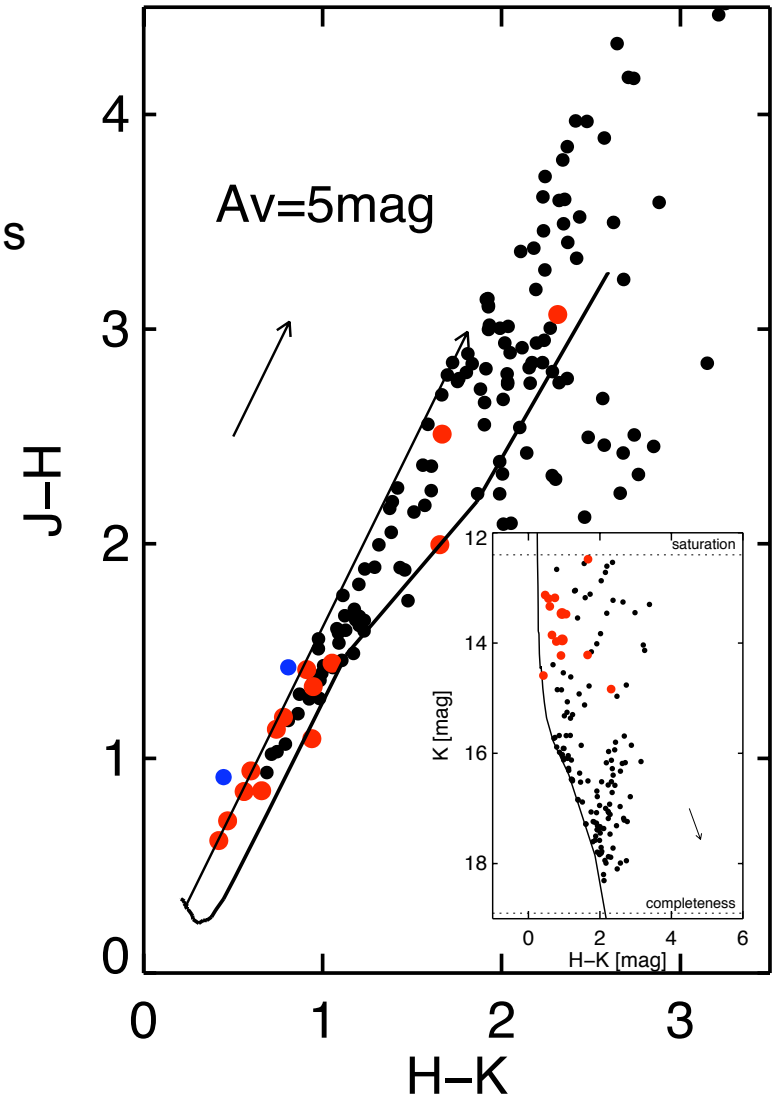
Selection of 145 candidate BDs and IPMO from several CMDs

Spectroscopic sample of candidates contains ~70 objects, ~16 have already been observed

Spectroscopic follow-up

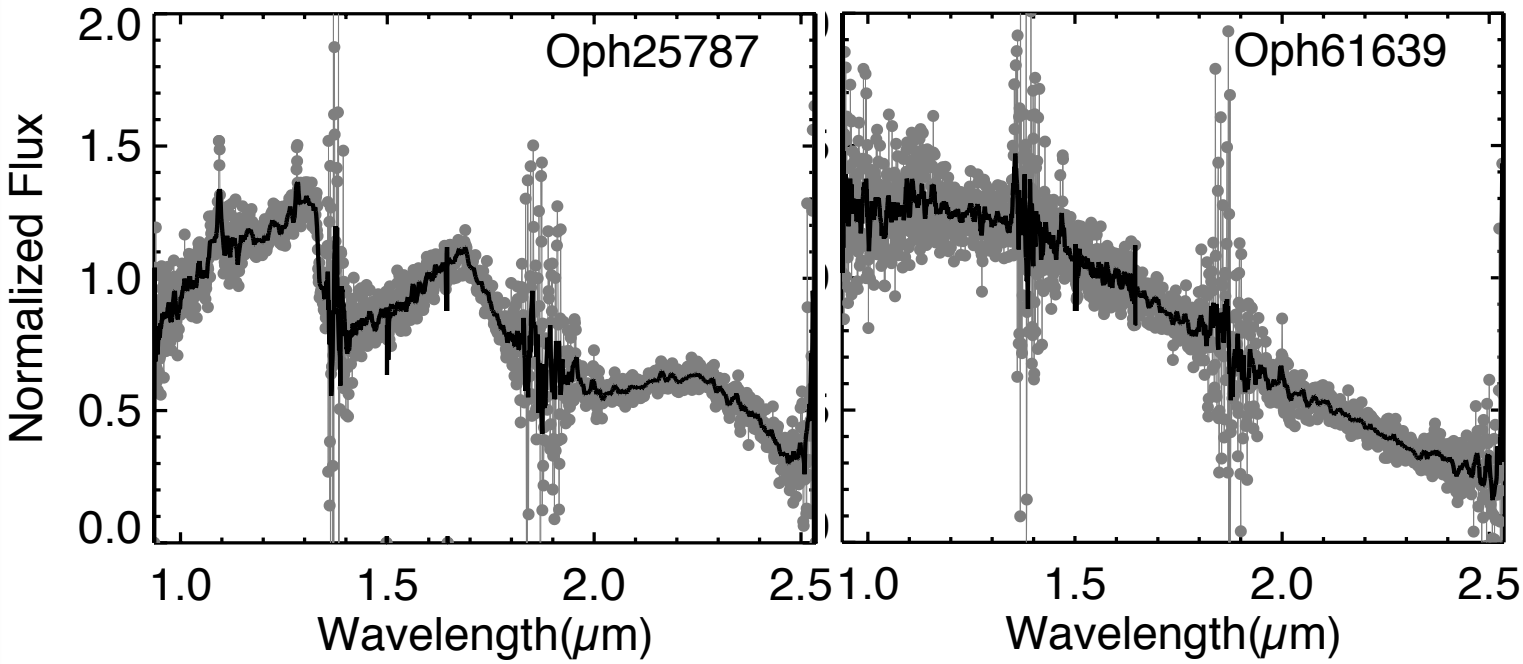
First round of observations: Near-IR low-resolution spectroscopy (JHK):

- TNG (completed)
- NTT (completed)
- VLT (on-going)

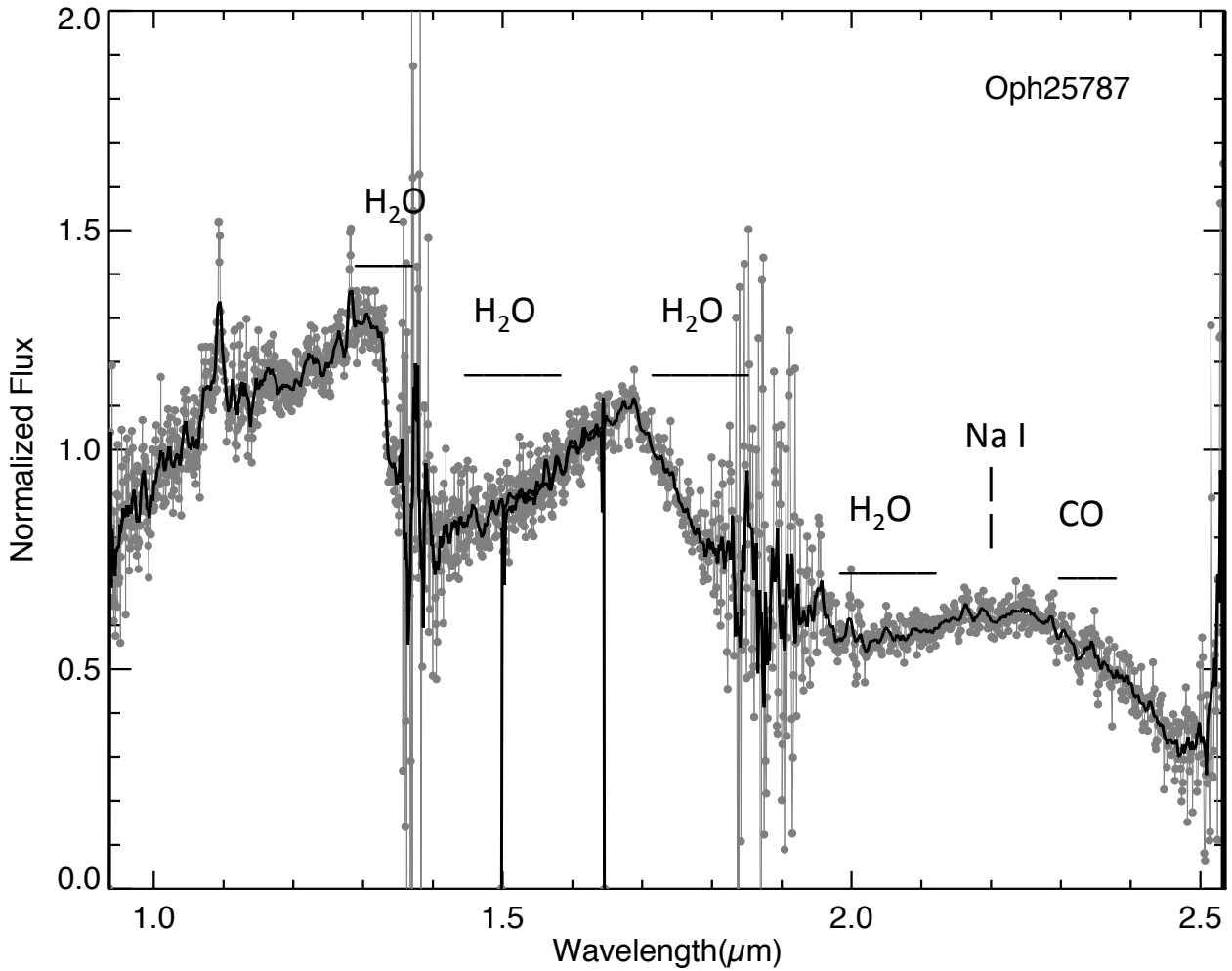


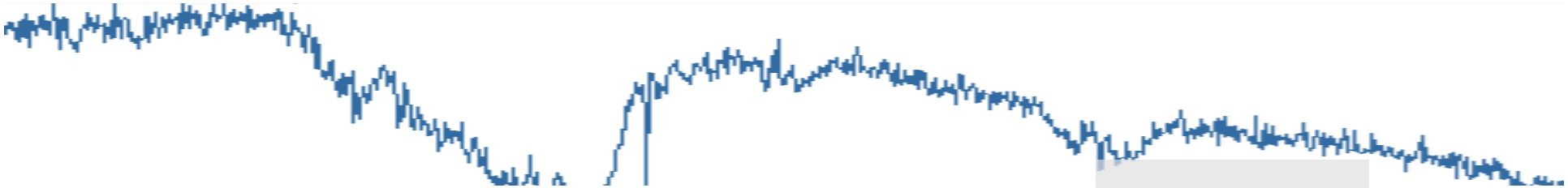
Aims

Determine Spectral type and low-gravity signatures to confirm the membership and youth of the candidate members



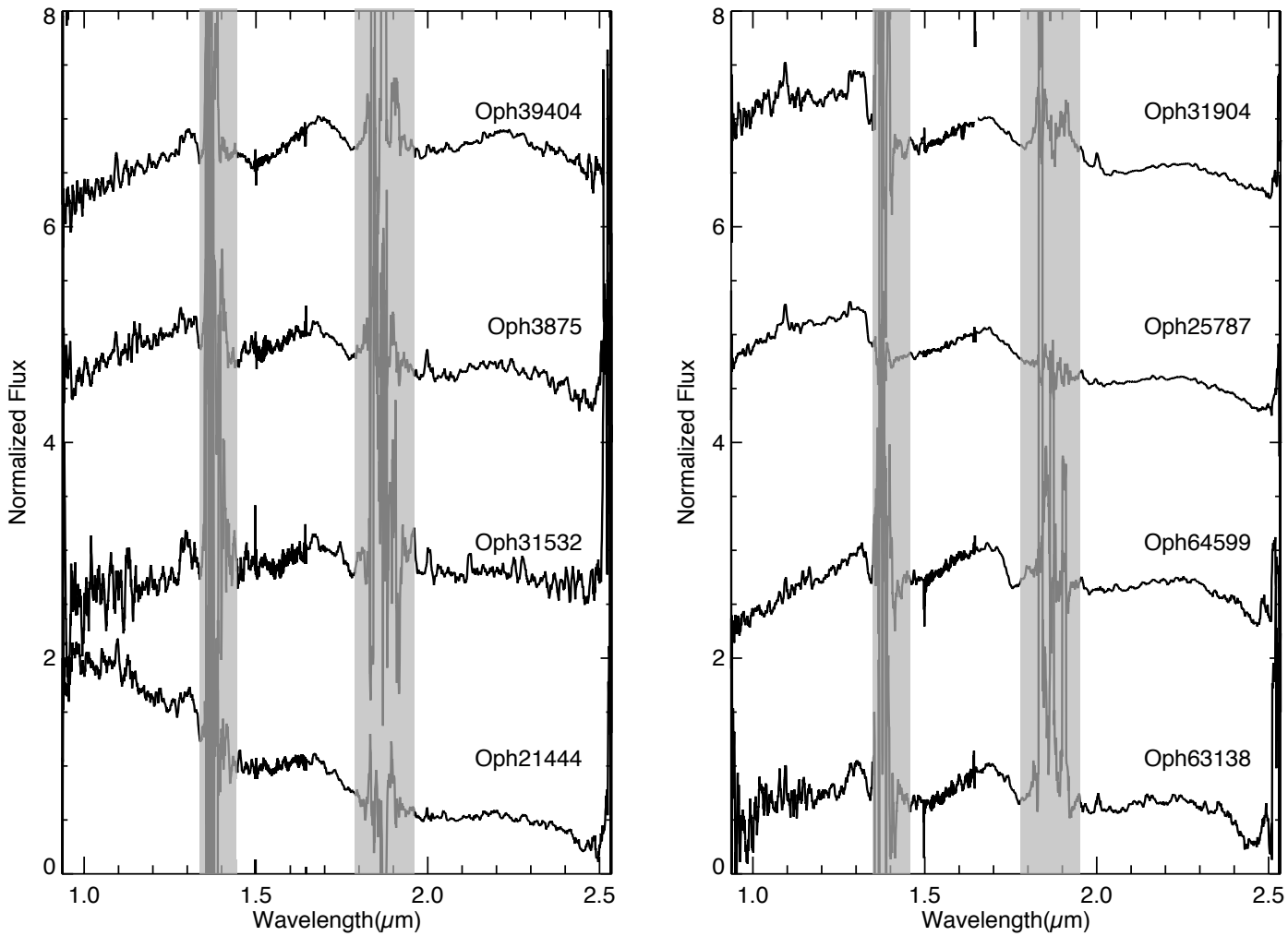
Spectroscopic follow-up





Project Dataset Results Follow-up On-going

Spectroscopic follow-up



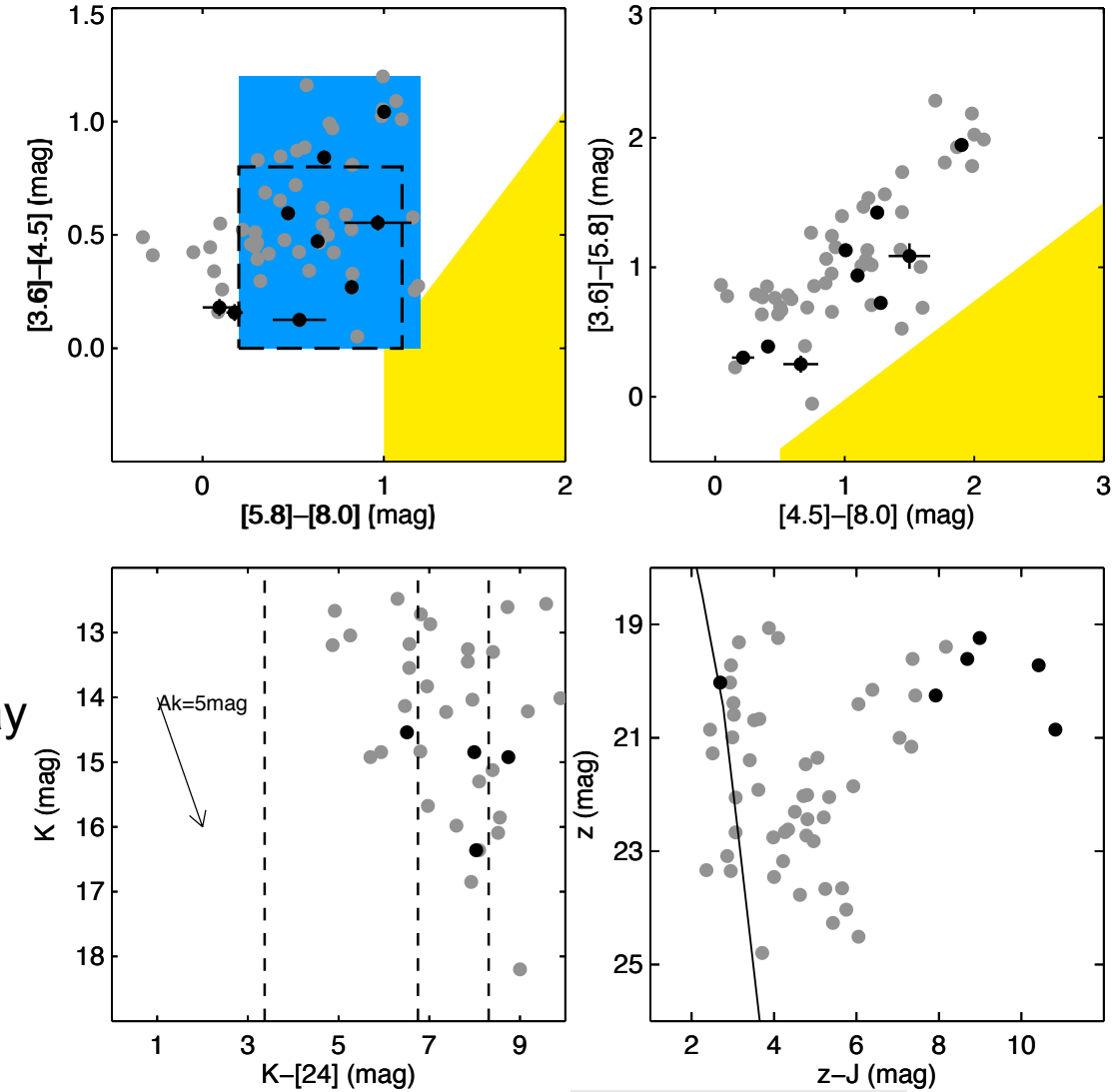
Multi-wavelength information

Combine near-IR results with multi-wavelength data:

-Subaru: optical

-Spitzer: mid-IR

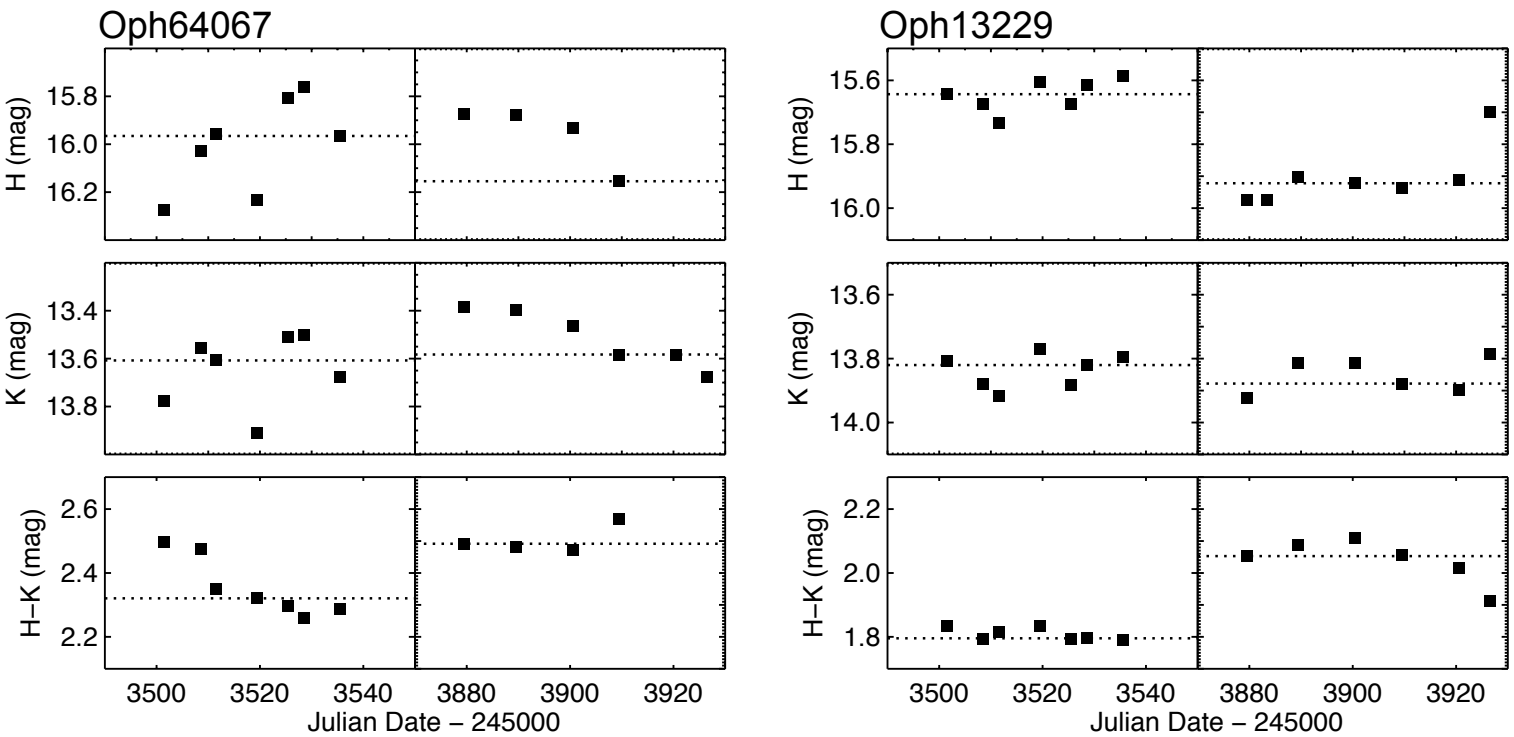
-XMM-Newton: X-ray



Variability

WFCAM/UKIRT: deepest near-IR variability study over ~1deg^2 region

14 epochs (day, month, and year sampling, *H*=[11,19], *K*=[10,18])



Summary

Very deep near-IR survey of Ophiuchus, covering ~1deg^2

Selection of 145 candidate BDs and IPMO from near-IR data, 70 suitable for spectroscopic follow-up

Near-IR spectroscopy for 16 candidates: majority has spectral type later than ~M5. Mid-IR and optical data supports the hypothesis that ~9 of these objects are young.

Future:

- Mass determination and membership assessment
- Continue spectroscopic follow-up
- Derive the contamination of the candidates from photometry using the spectroscopy results

Catarina Alves de Oliveira

LAOG
Laboratoire d'Astrophysique de Grenoble