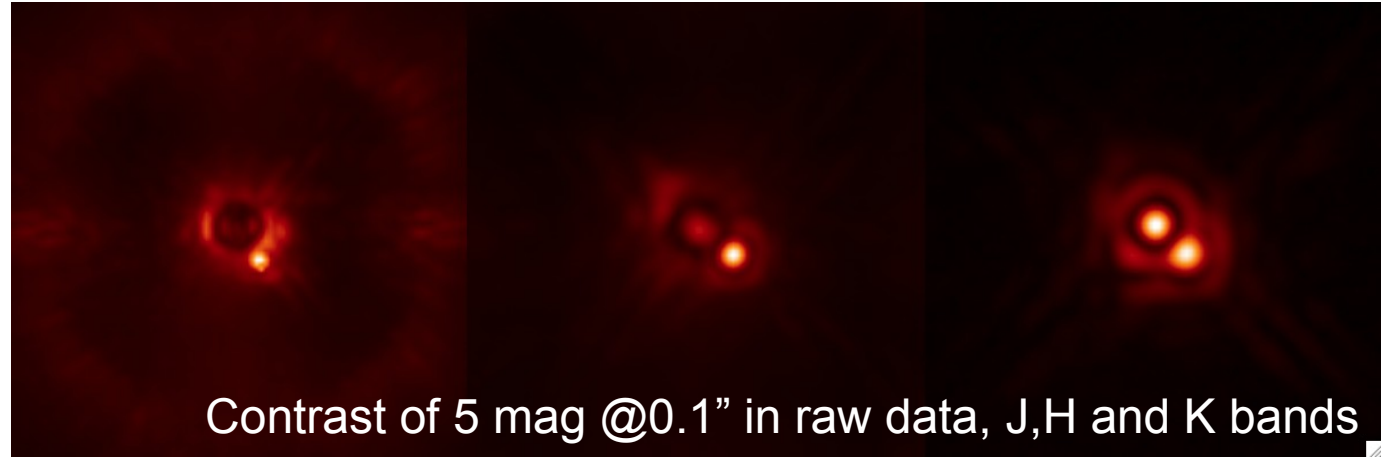
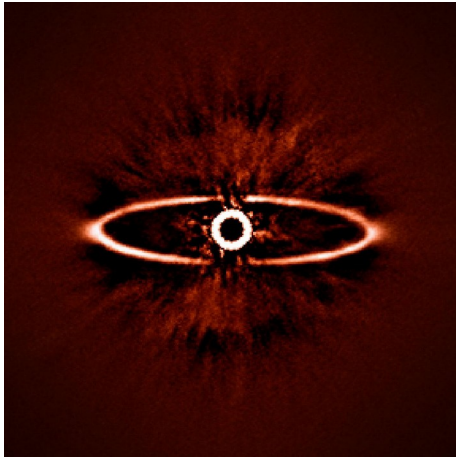


Community tools for imaging archive data: SPHERE-DC and DIVA+



Contrast of 5 mag @0.1'' in raw data, J,H and K bands

SPHERE-DC currently evolving into High Contrast Data Center

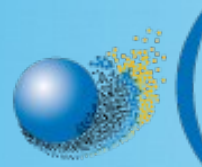
Philippe Delorme @IPAG

OSUG

Observatoire des
Sciences de l'Univers
de Grenoble



Observatoire
de la CÔTE d'AZUR



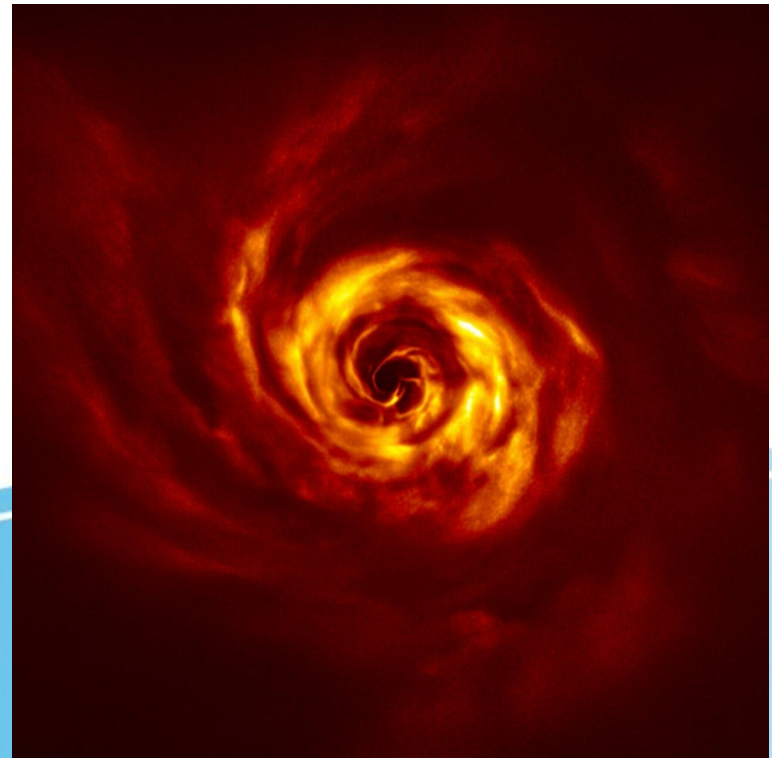
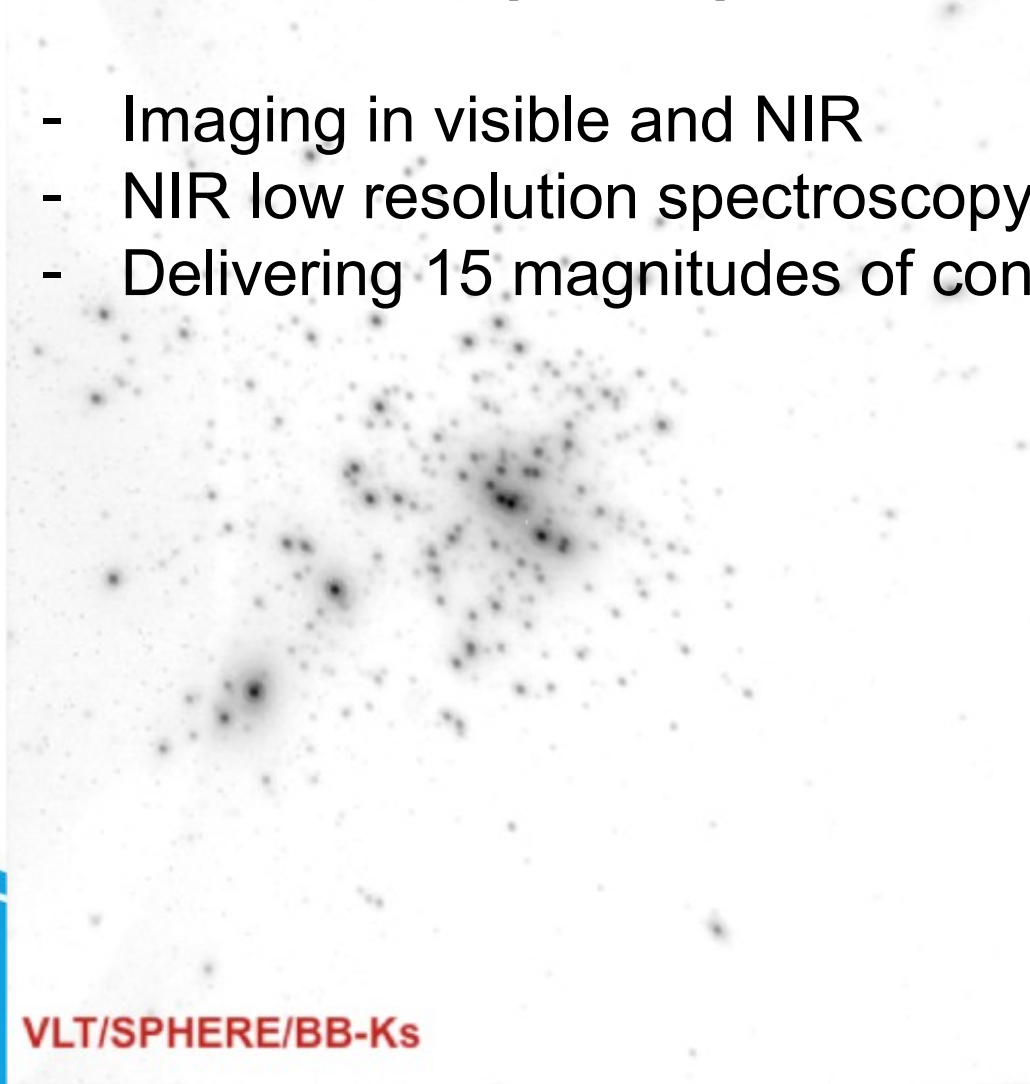
Institut Pythéas
Observatoire des Sciences de l'Univers
Aix-Marseille Université



What is SPHERE?

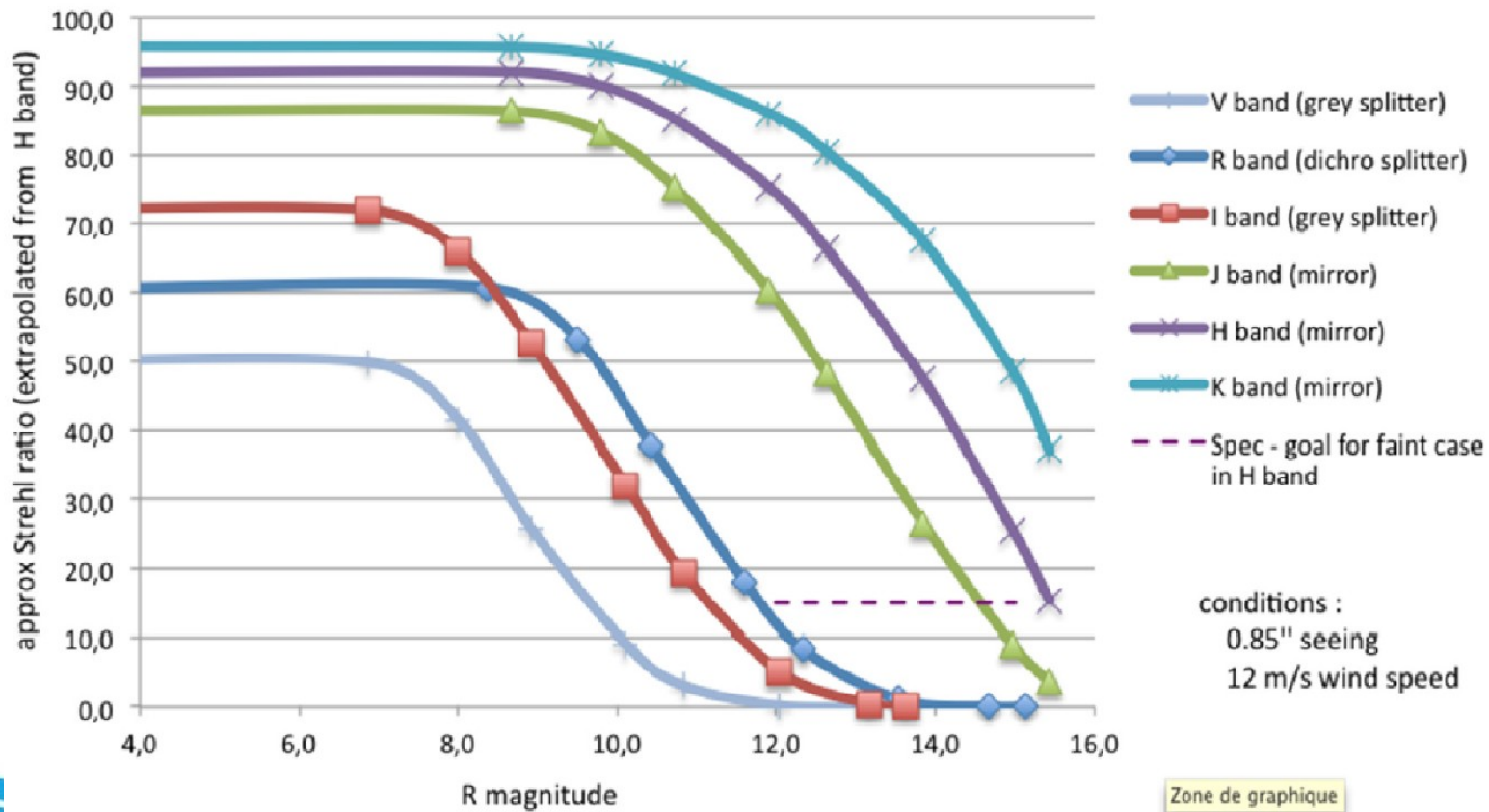
Extreme Adaptive optics instrument on 8-m VLT

- Imaging in visible and NIR
- NIR low resolution spectroscopy capabilities with $R \sim 30$
- Delivering 15 magnitudes of contrast @0.5" of separation



SPHERE capabilities

12.5"x12.5" field size in NIR, can lock AO on host stars with $G < 14$
~ all PLATO targets




What is the SPHERE-DC ?

N. Meunier, D. Albert, P. Delorme, J. Milli, E. Lagadec, D. Mouillet

- A French-led community service using the “duty service” of several astronomers, building on the GTO expertise
- A massive automated data reduction tool that use a database approach to couple together algorithms, data and hardware
- Hardware: access to 2 computers grids linked to >100To storage
- A reduced data storage and distribution facility, notably via **DIVA+** (*H. Le Coroller*)

Data reduction @ SPHERE-DC

- Optimised pipeline from raw data to post processing, detection limits and such
 - Pipeline quality is good but is often 1-2 years late on the latest algos, because :
 - Pipeline **robustness/reliability is key**: >6000 heterogenous dataset to reduce and only minimal tuning of pipeline needed
 - Works best for point sources around bright stars
 - New algos regularly added, capability to rereduce the full SPHERE archive
- 

What is currently available ?

Reduced data at several stages:

- Clean data cubes ready for post processing (ADI, SDI or such)
- Fully reduced stacks after ADI/SDI/ASDI

Currently in data base :

- > 6000 reduced datasets
- > **2000 independent targets**

- > 100 To of SPHERE data

Retrieving data SPHERE-DC, DIVA+ or ESO phase 3 ?

ESO phase 3
Similar as DIVA
ESO formatted
Just starting now

*In all cases easy download of massive
data amounts via downloads scripts*

Deep Imaging Virtual Archive
Data release of final reduction steps
via web browser. **Target based**
More check of data quality

<https://cesam.lam.fr/diva/>


Sphere-DC
Data reduction
Data release of all reduction steps
via java client. **All data**
Moderate check of data quality

<https://sphere.osug.fr/spip.php?rubrique16&lang=en>

Raw data @ESO archive

Examples of custom reductions for LP

LP BEAST, COBREX, SPHERE GTO more than 400 targets over 6 years

- Custom reduction pipeline optimised for science case
 - Full reduction possible a few days after the observations
 - Detection and characterisation of point sources
 - Re-reduction of data with new algorithms when they are made available
 - Possibility to use private advanced algos if manpower help provided and public release possible
- 

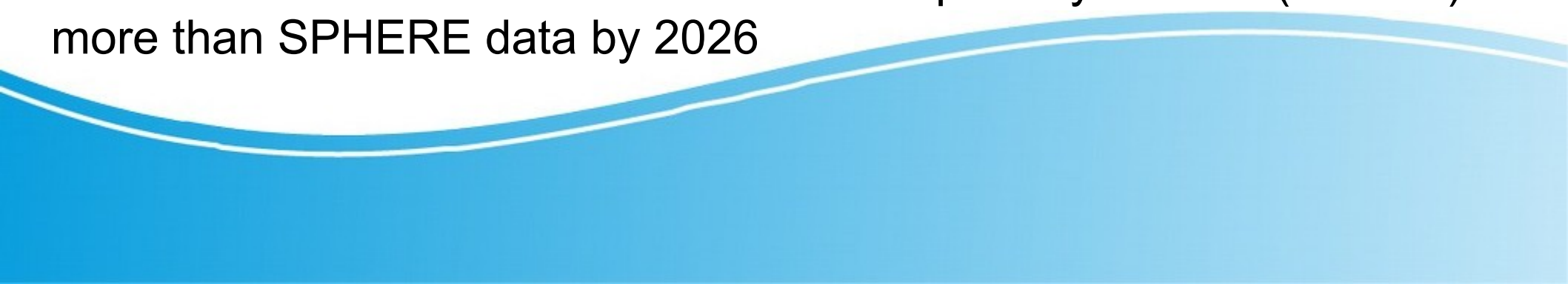
From SPHERE-DC To High-Contrast-DC

The automated reduction tool, its database and its hardware link work well


Easy to adapt to reduce data from similar instruments !

- GPI *ongoing*
- ERIS ?
- SPHERE + ?
- other possible

The HC-DC should be able to reduce and publicly release (much ?) more than SPHERE data by 2026



Possible interactions between SPHERE-DC and PLATO-GOP

- PLATO GOP downloads public reduced dataset from SPHERE-DC when needed for follow-up. *Available in any case.*
 - PLATO GOP runs a SPHERE observing program and asks SPHERE-DC to reduce it. *Easy to do, but need to organize.*
 - PLATO GOP partners with SPHERE-DC to carry out a systematic re-reduction of all relevant high contrast data archive on several instruments.
Need some manpower help to adapt, test and optimise pipelines on new instruments
 - Other ?
- 

Thanks !

Philippe Delorme for the SPHERE-DC

Ressources:

<https://sphere.osug.fr/spip.php?rubrique16&lang=en>

<https://cesam.lam.fr/diva/>

