SPIRou

Daniel Devost
Director of Science Operations.
Canada-France-Hawaii Telescope
Jim Houck Symposium, June 2017

Photo: Sean Goebel

SPIRou

Le SpectroPolarimètre InfraRouge

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SPIRou

Le SpectroPolarimètre InfraRouge

The latest and likely the last instrument to come to CFHT

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SPIRou

Le SpectroPolarimètre InfraRouge

France

Brazil

Portugal

Canada

Switzerland

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SPIRou

Le SpectroPolarimètre InfraRouge

PI Jean-François Donati, IRAP, Toulouse France.
Co-PI René Doyon, Université de Montréal, Canada.

France

Brazil

Canada

Switzerland

Da

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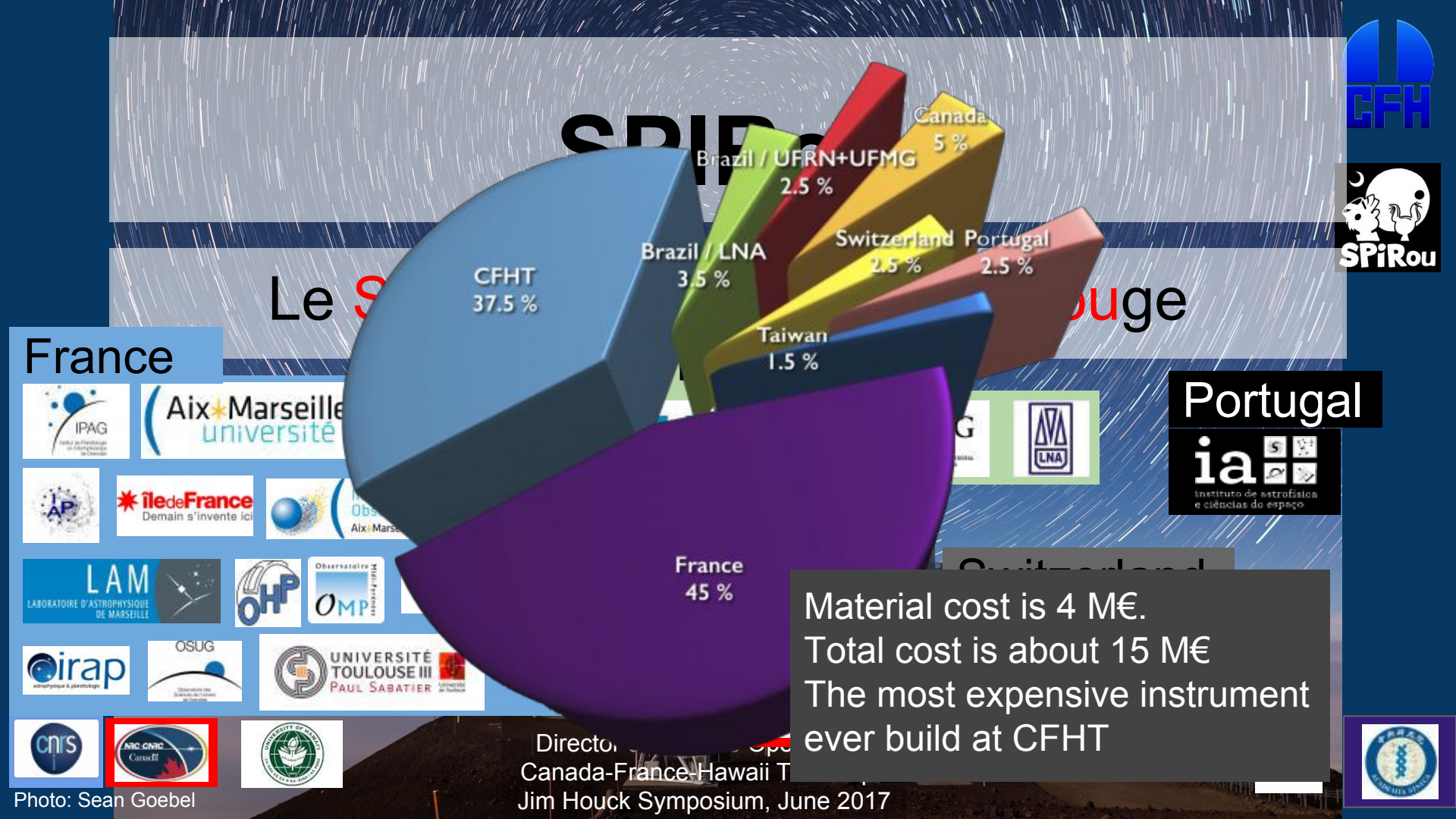
Canada
5 %
Brazil / UFRN+UFMG
2.5 %
Brazil / LNA
3.5 %
Switzerland
2.5 %
Portugal
2.5 %
CFHT
37.5 %
Taiwan
1.5 %
France
45 %
Material cost is 4 M€.
Total cost is about 15 M€
The most expensive instrument ever build at CFHT
France
Portugal
SPIRou
CFH
Photo: Sean Goebel
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Introducing CFHT

Instruments
The QSO system

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3.6 meter telescope.

Summit of Maunakea on the island of Hawaii

4207m (13796 feet).

Photo: Sean Goebel

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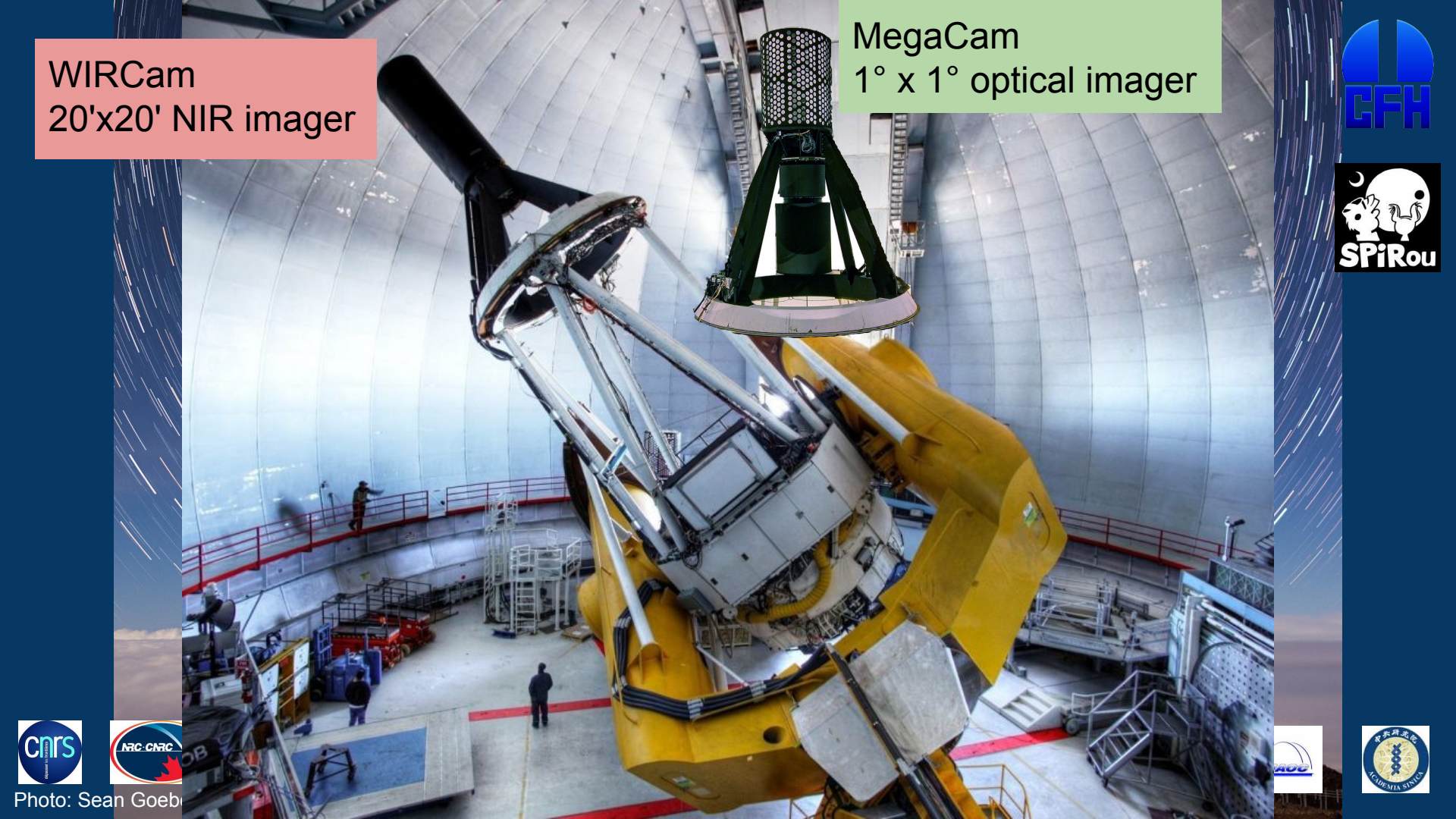
WIRCam
20'x20' NIR imager
CFH
SPiRou
cnrs
NRC·CNRC
Photo: Sean Goeb


WIRCam
20'x20' NIR imager
MegaCam
1° x 1° optical imager
Photo: Sean Goeb

WIRCam
20'x20' NIR imager

MegaCam
1° x 1° optical imager

ESPaDOnS
High resolution (65-80k)
fiber fed
spectropolarimeter

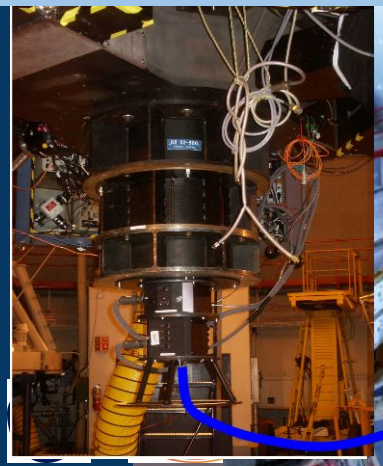


Photo: Sean Goeb

WIRCam
20'x20' NIR imager

MegaCam
1° x 1° optical imager

SITELLE
11'x11' Imaging FTS.

ESPaDOnS
High resolution (65-80k) fiber fed spectropolarimeter

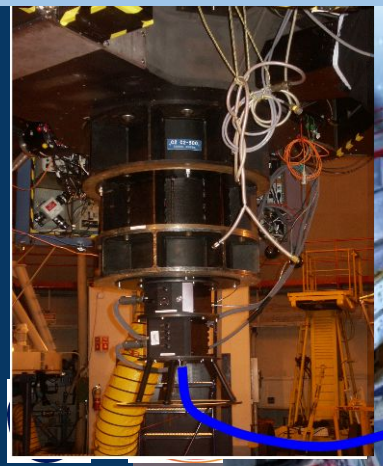


Photo: Sean Goeb

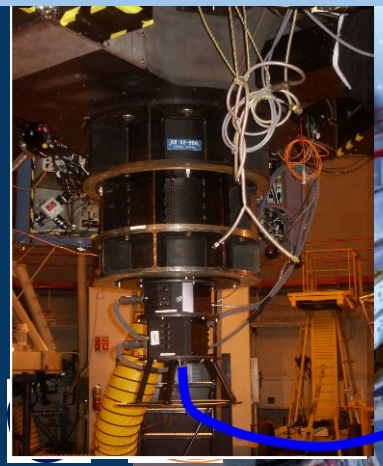
WIRCam
20'x20' NIR imager

MegaCam
1° x 1° optical imager

SITELLE
11'x11' Imaging FTS.

ESPaDOnS
High resolution (65-8
fiber fed
spectropolarimeter

All these instruments are operated in Queue mode.



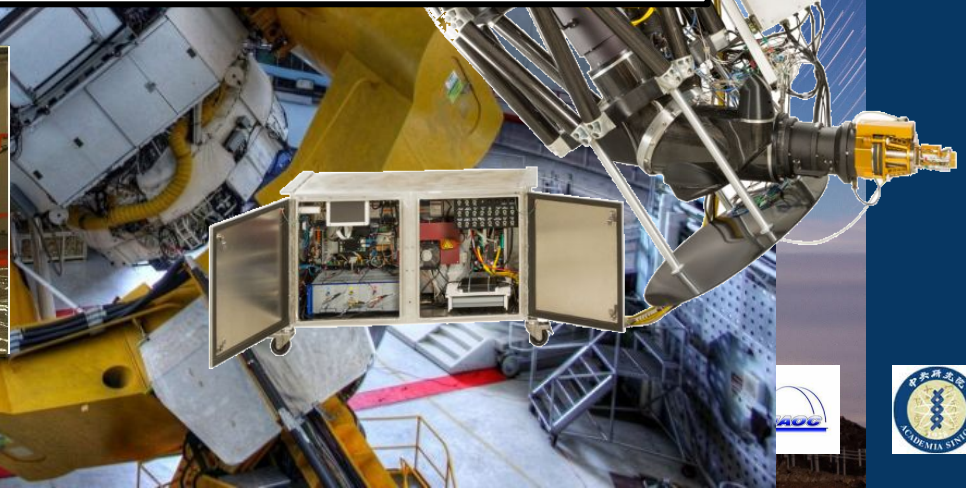


Photo: Sean Goeb

The QSO system at CFHT.

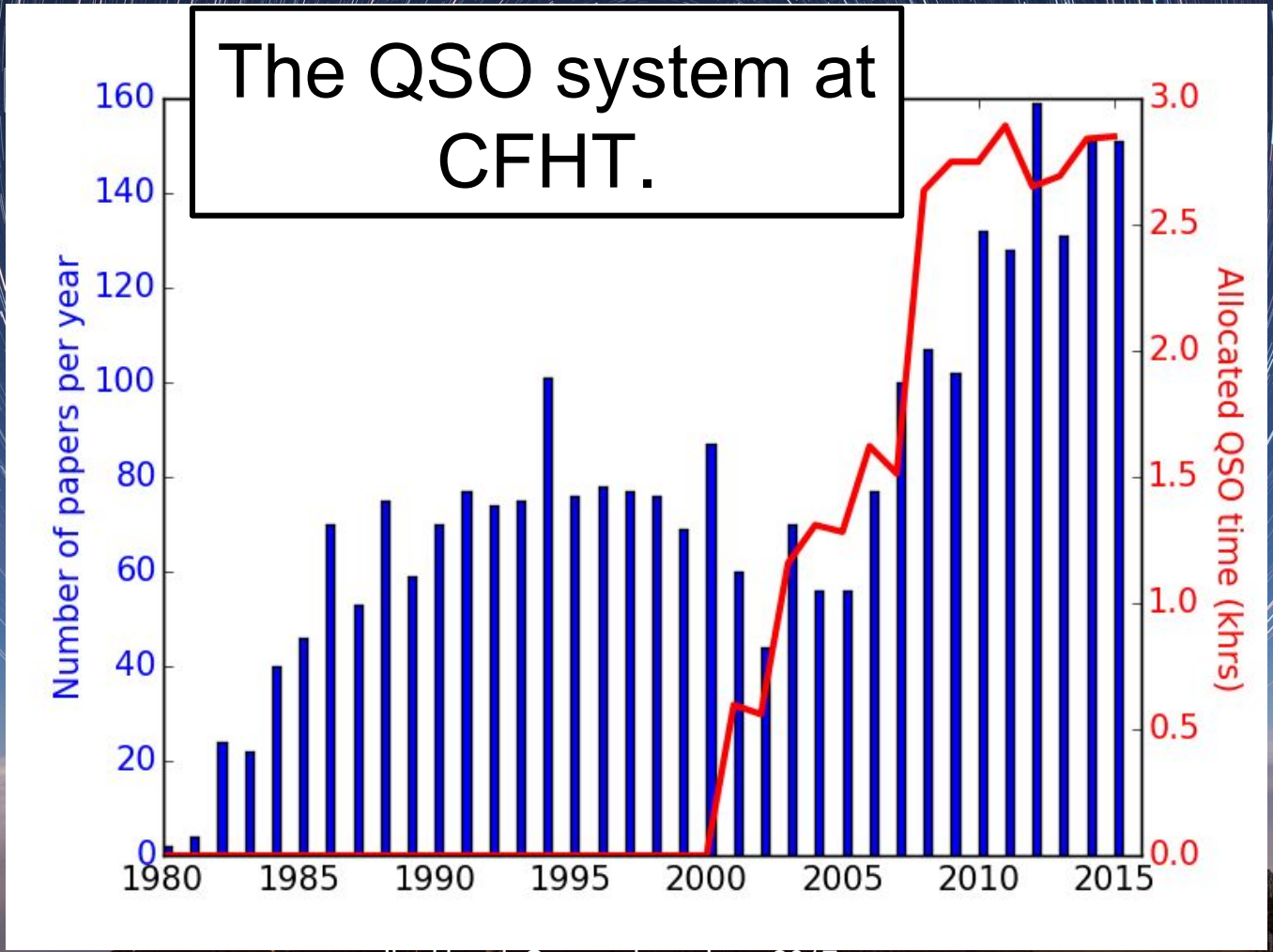


Photo: Sean Goebel

SPIRou Science

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SPIRou Science

Primary Science:

- Detecting Exoplanets around low mass M dwarfs.

Secondary Science:

- Magentized star planet formation.
- Dynamos, starspots & weather patterns and the formation of brown dwarfs & massive stars
- Planetary atmosphere.
- Chemical evolution and kinematics of the MW.

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SPIRou Science requirements

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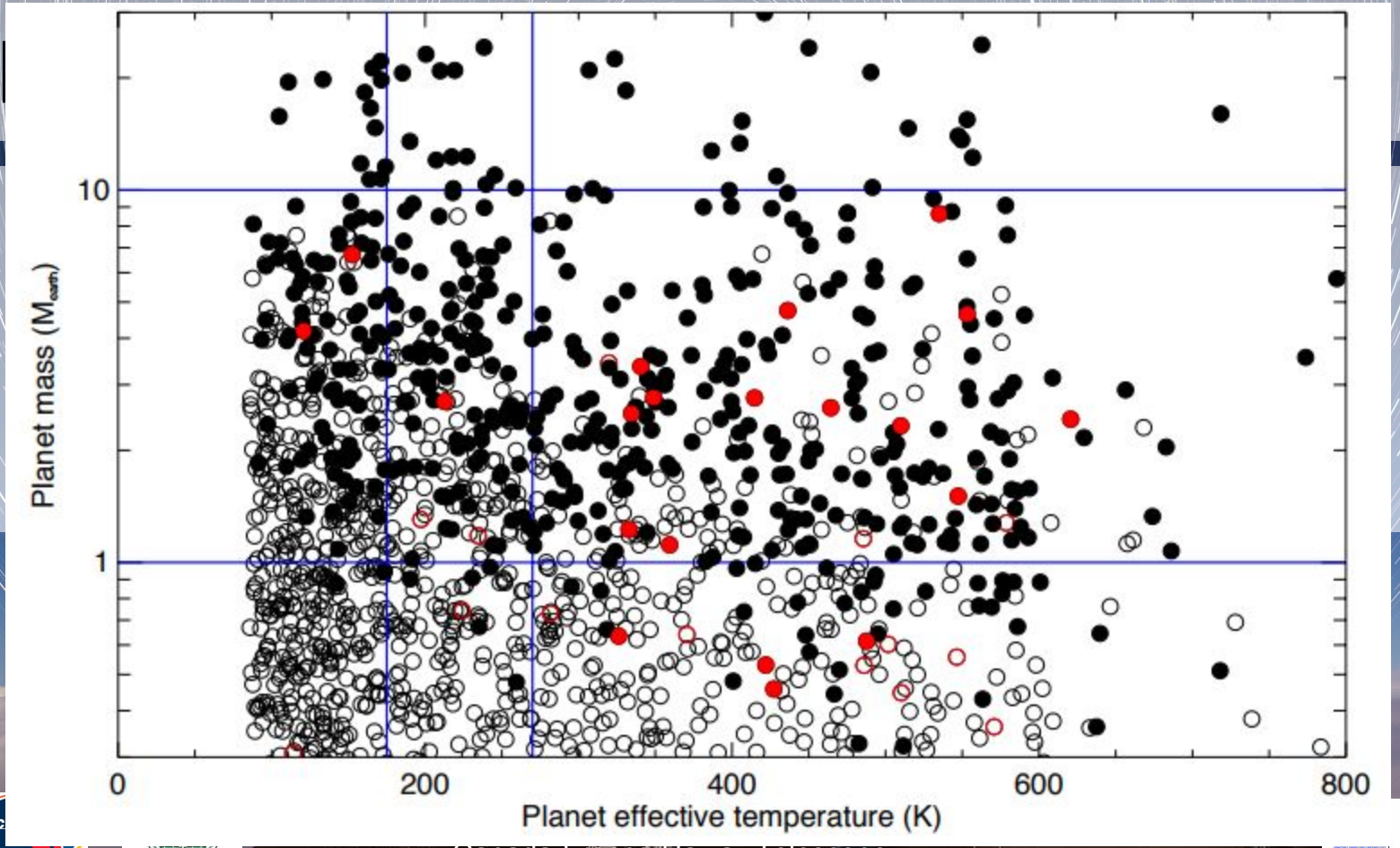

Photo: Sean Goebel

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Construction and schedule

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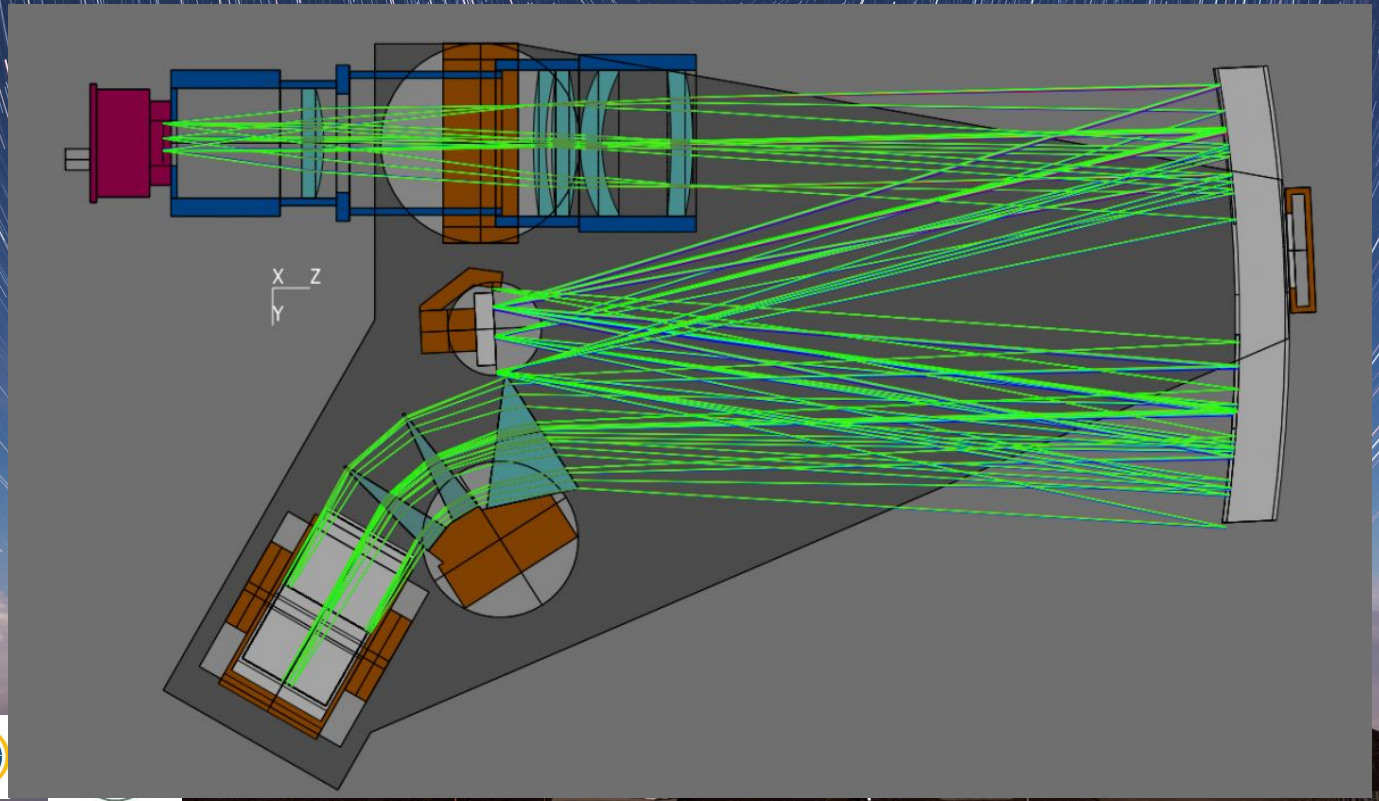
Optical design



Dewar assembly

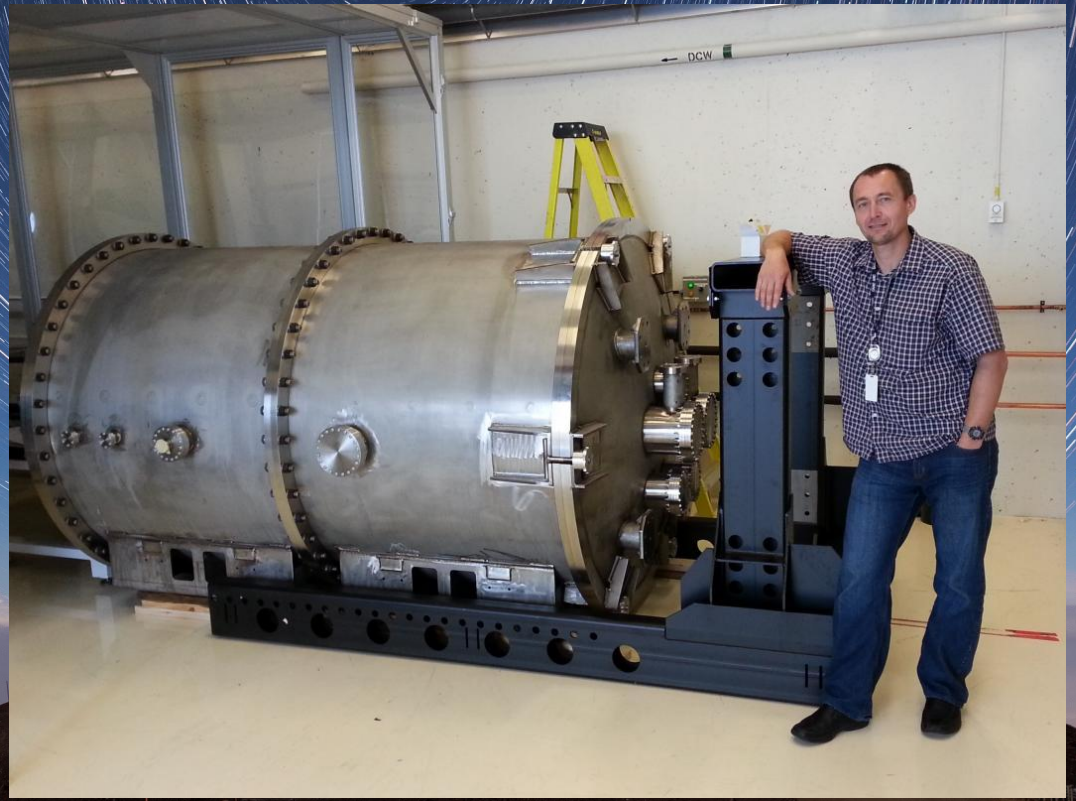


Photo: Sean Goebel

The Instrument

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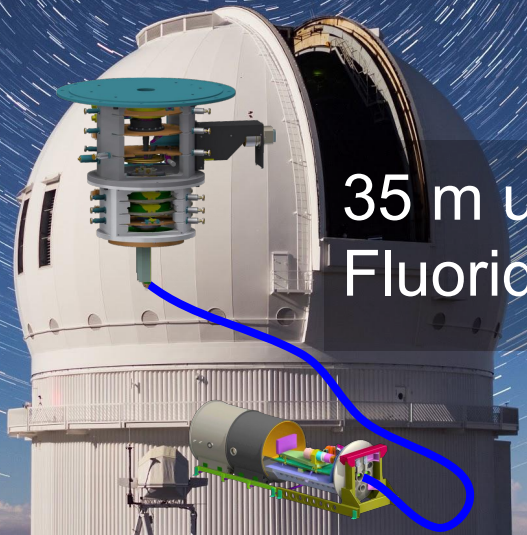
The instrument



35 m ultrapure
Fluoride fiber link

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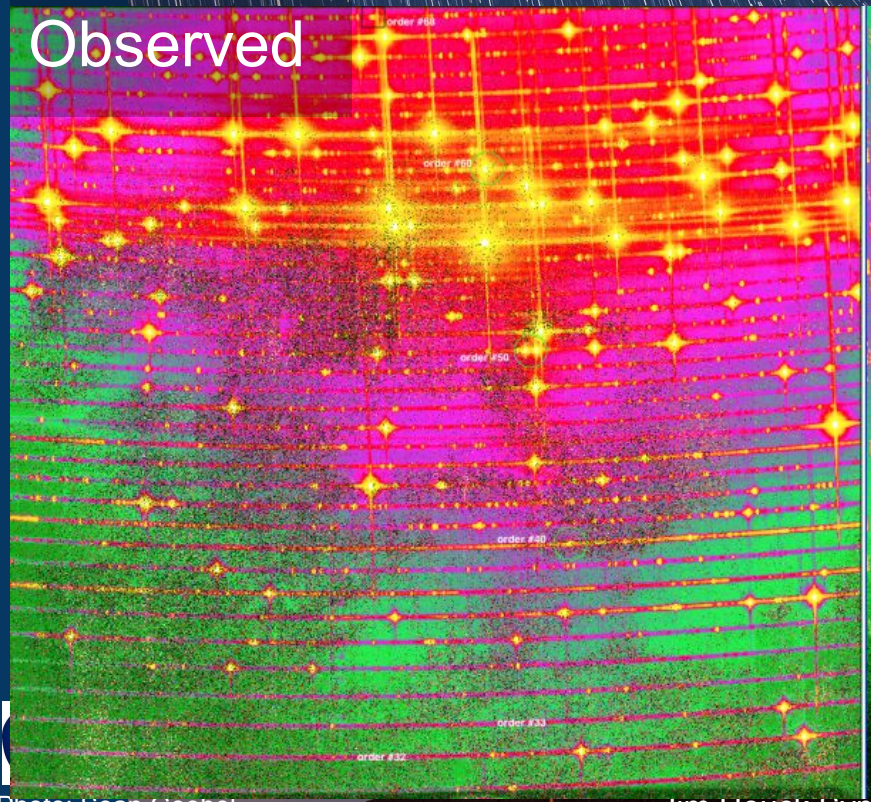
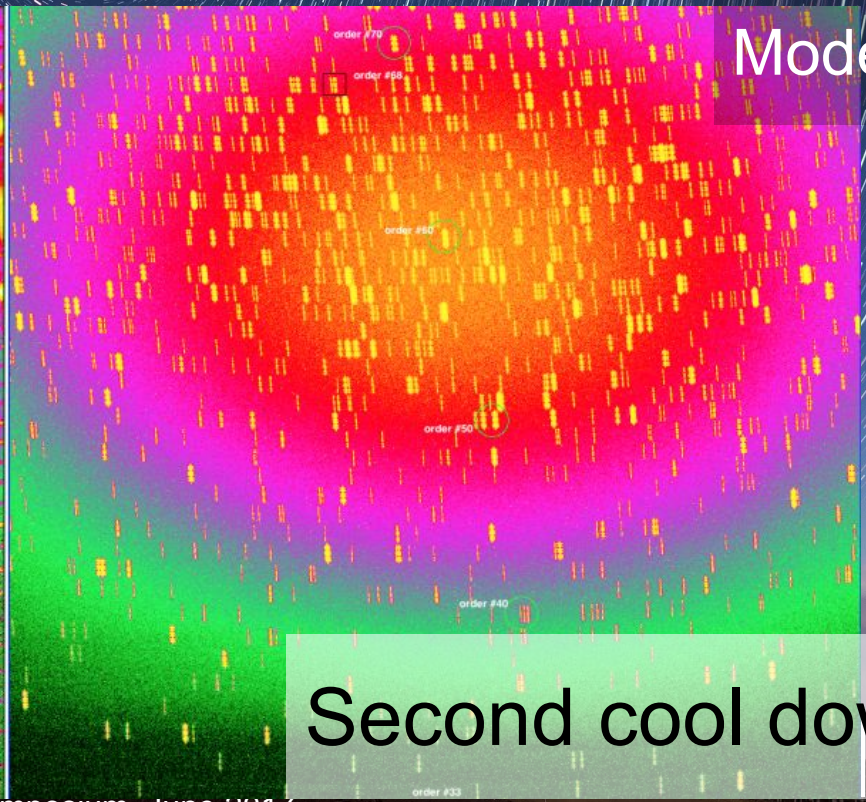
Integration and testing.

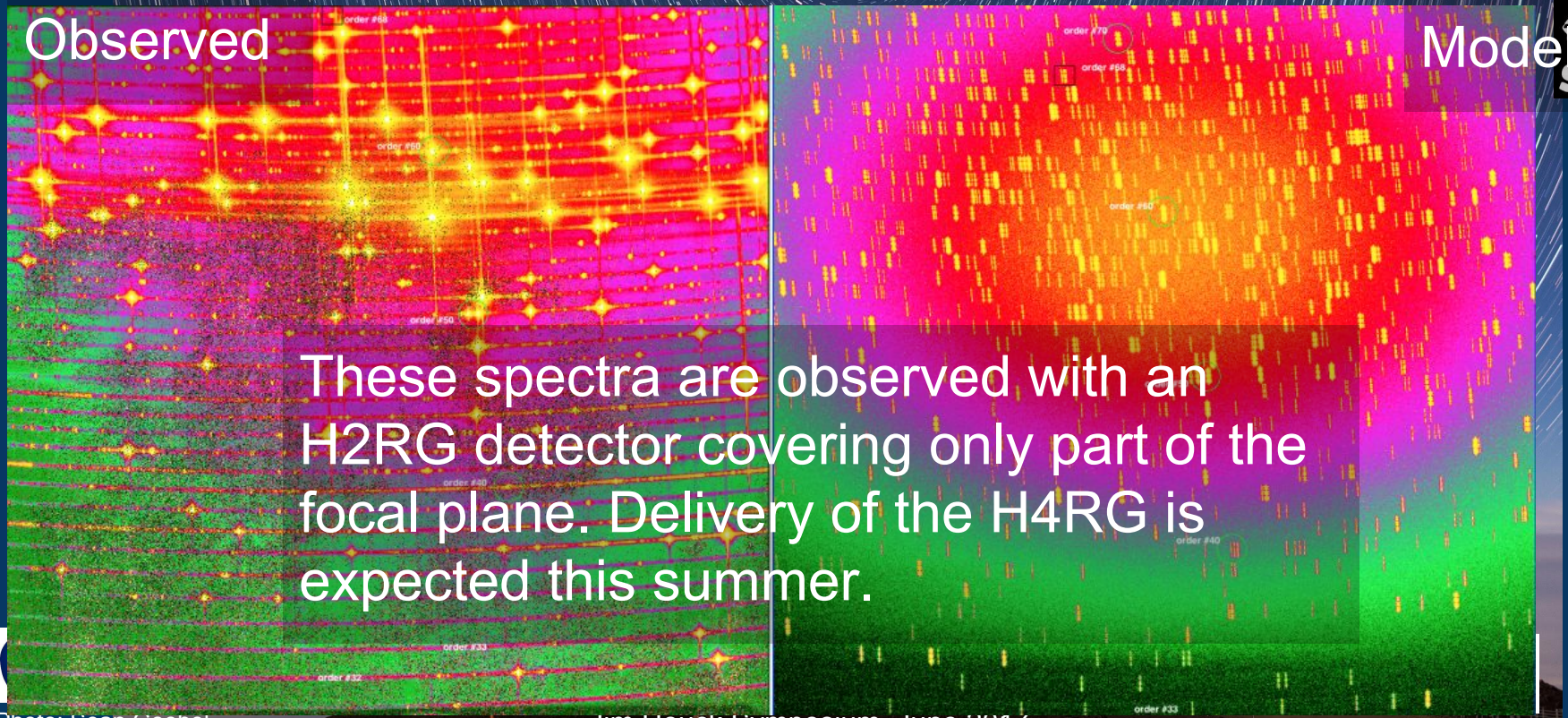




Second cool down.

Photo: Sean Goebel

We are at the second cooling cycle.



Integration and testing.

Cooling curve. Thermal stability is meeting the specs (1.6 mK).

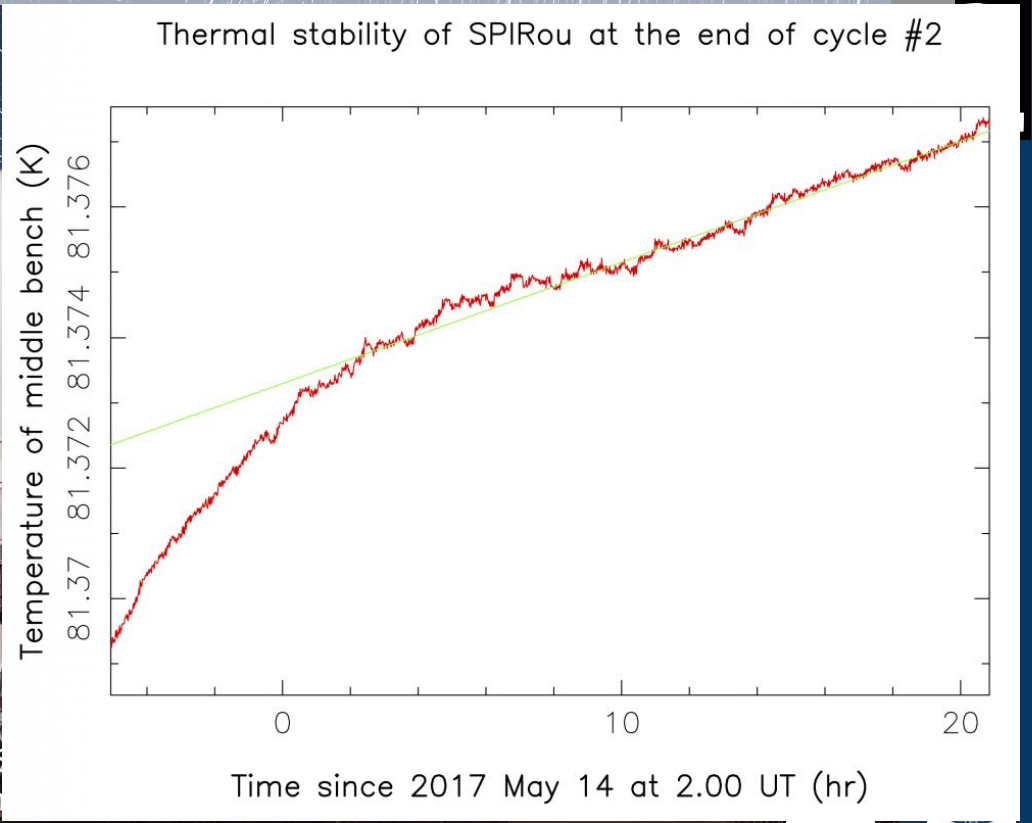


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Photo: Sean Goebel

A real world example of the capabilities of SPIRou.

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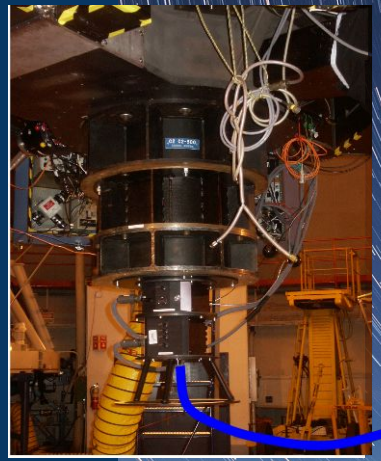
Photo: Sean Goebel

Monitoring of V830 Tau.



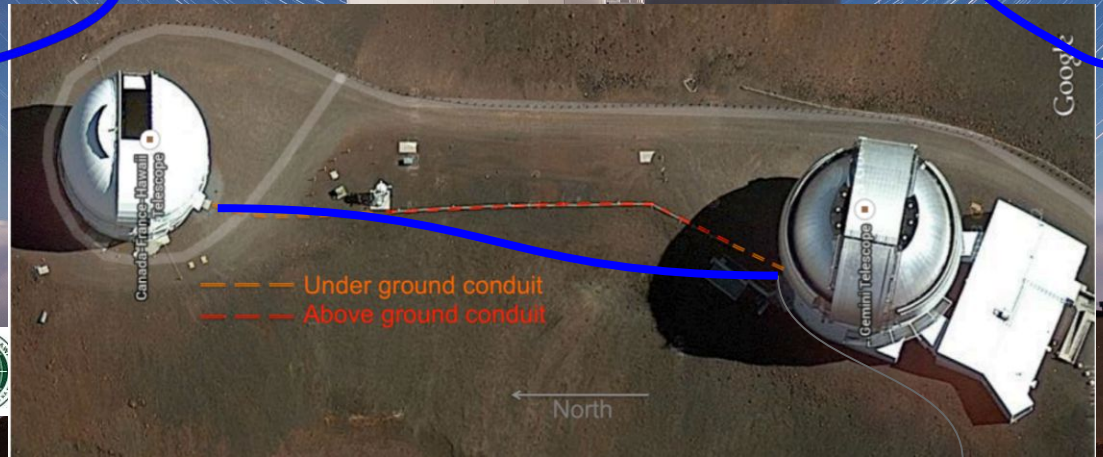
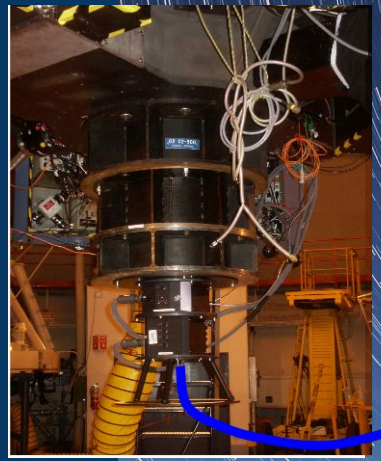
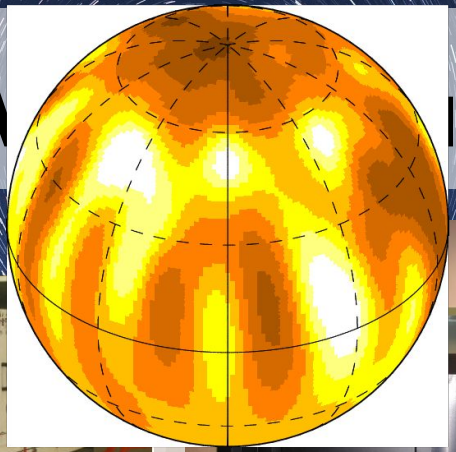
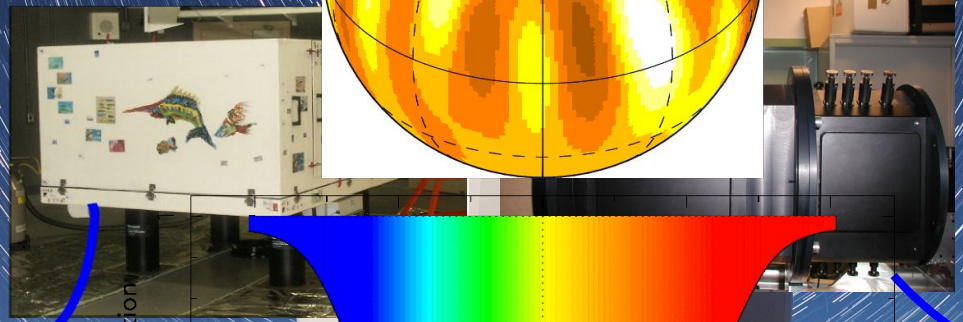


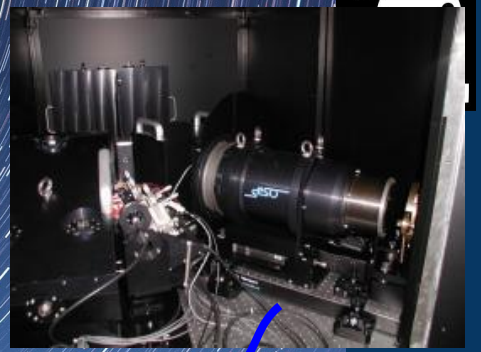
Photo: Sean Goebel

Monitoring of V









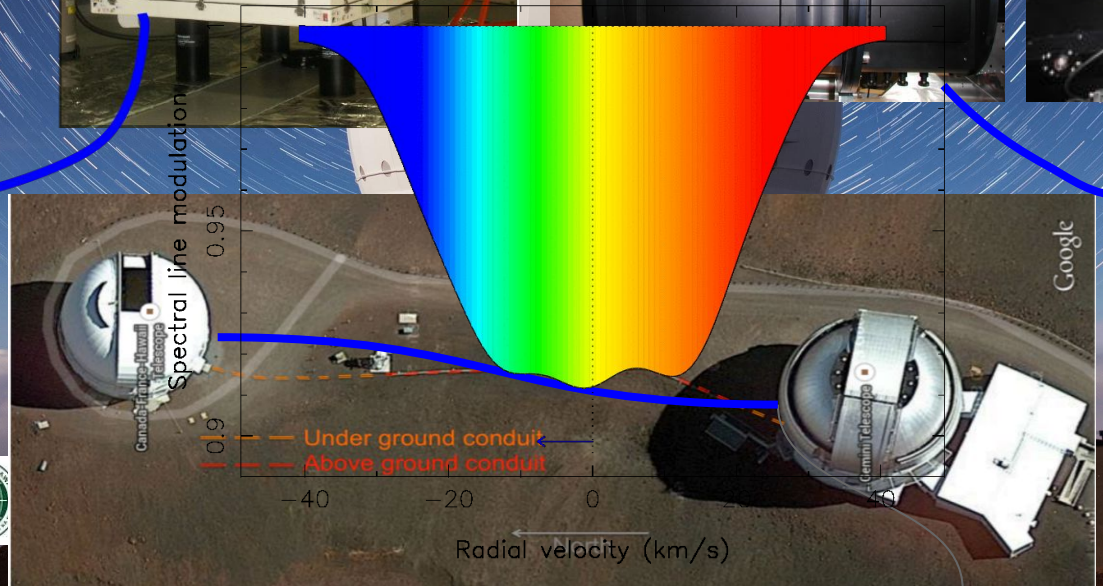
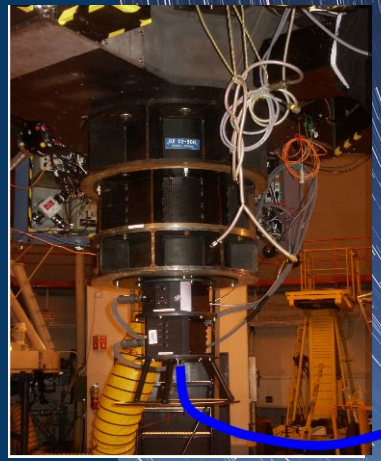
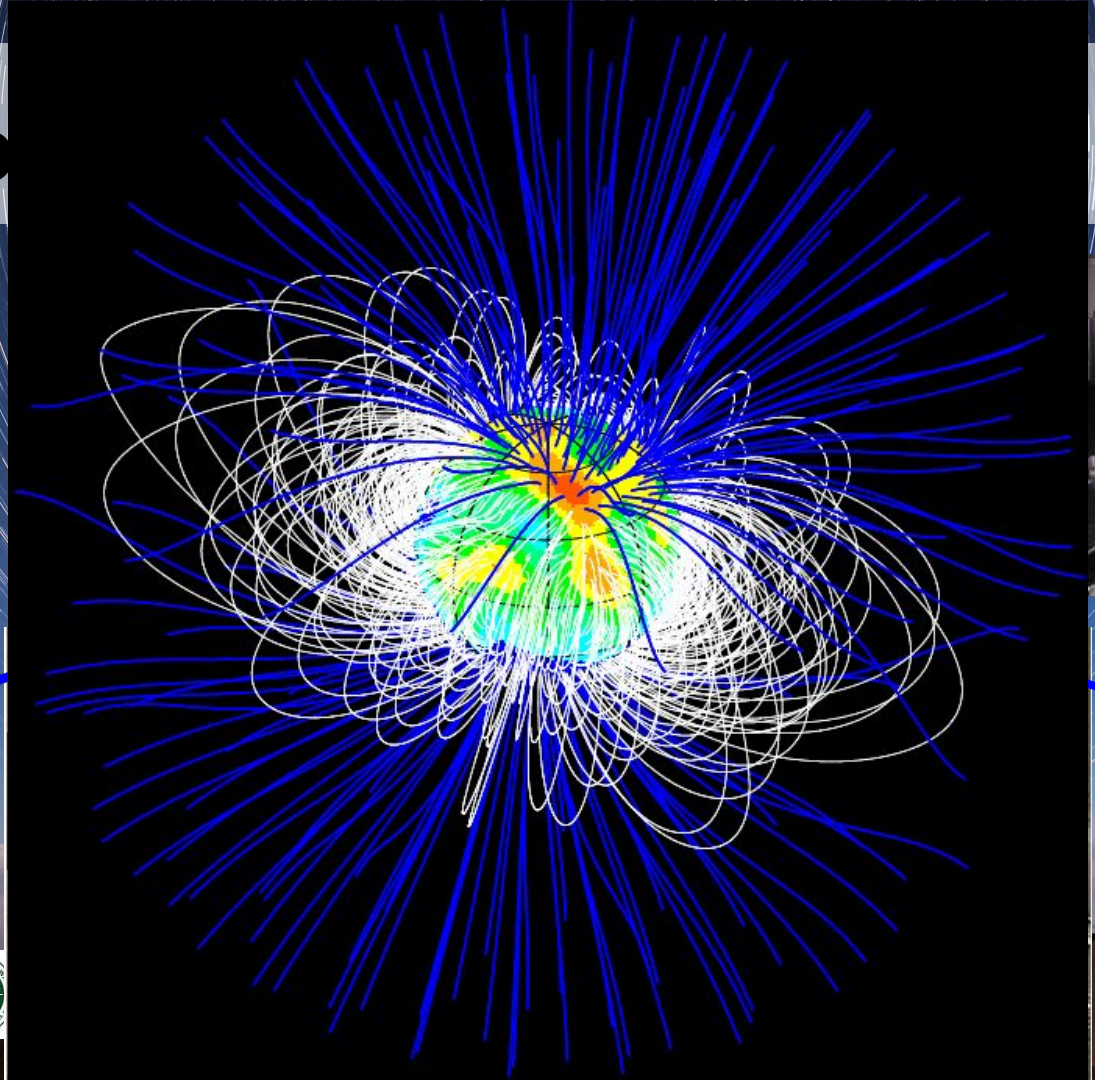


Photo: Sean Goebel

Monito





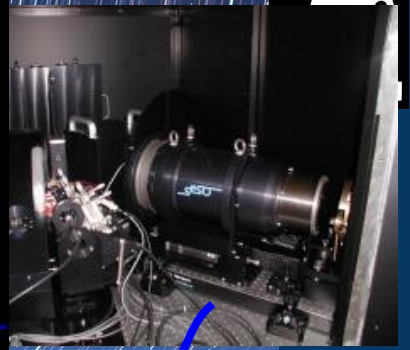
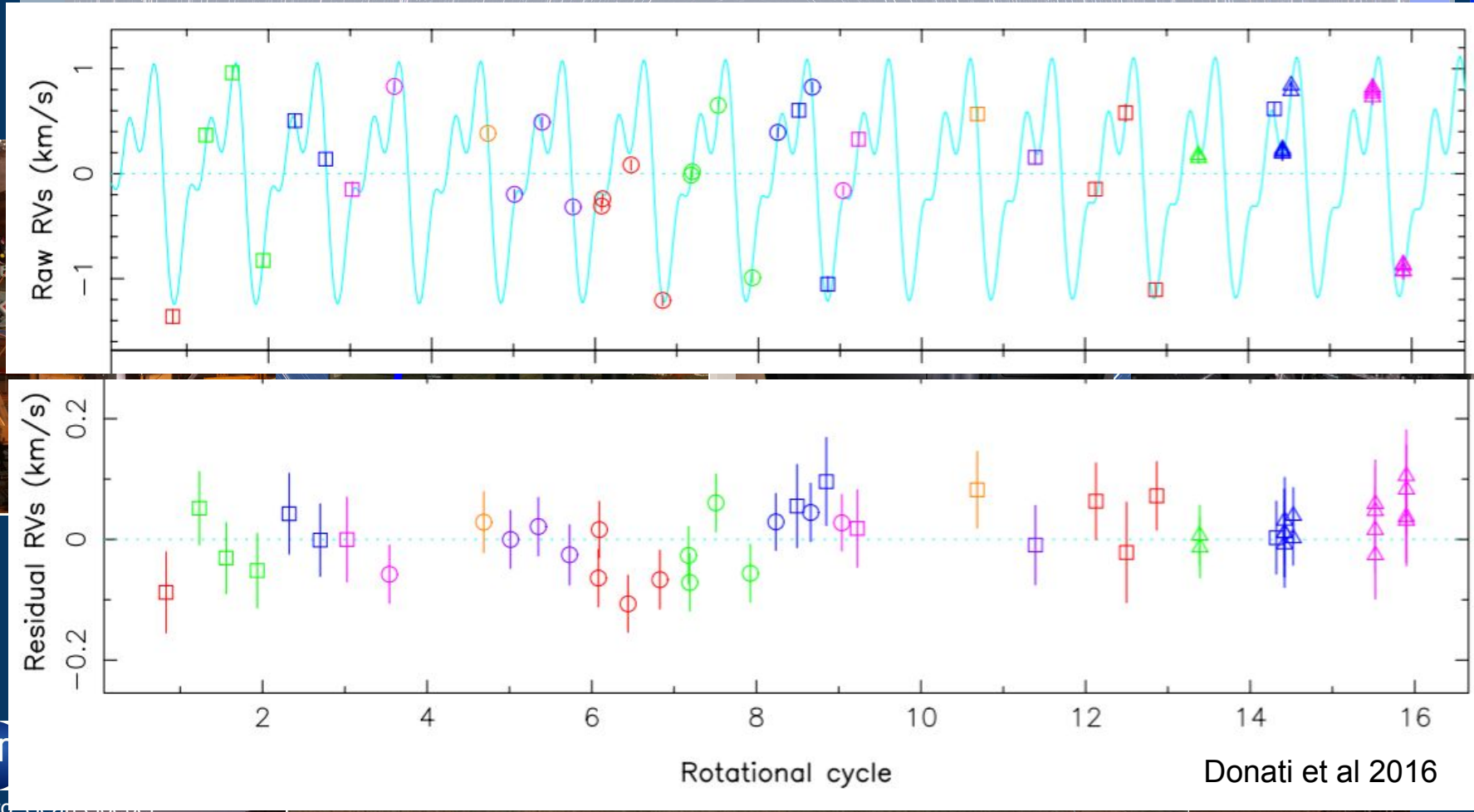


Photo: Sean Goebel



Donati et al 2016

Photo: Sean Goebel

Monitoring of V830 Tau

0.77 M_{2I}

0.057 AU

The star is 2 Myrs old. This shows that early migration is possible in planetary systems.

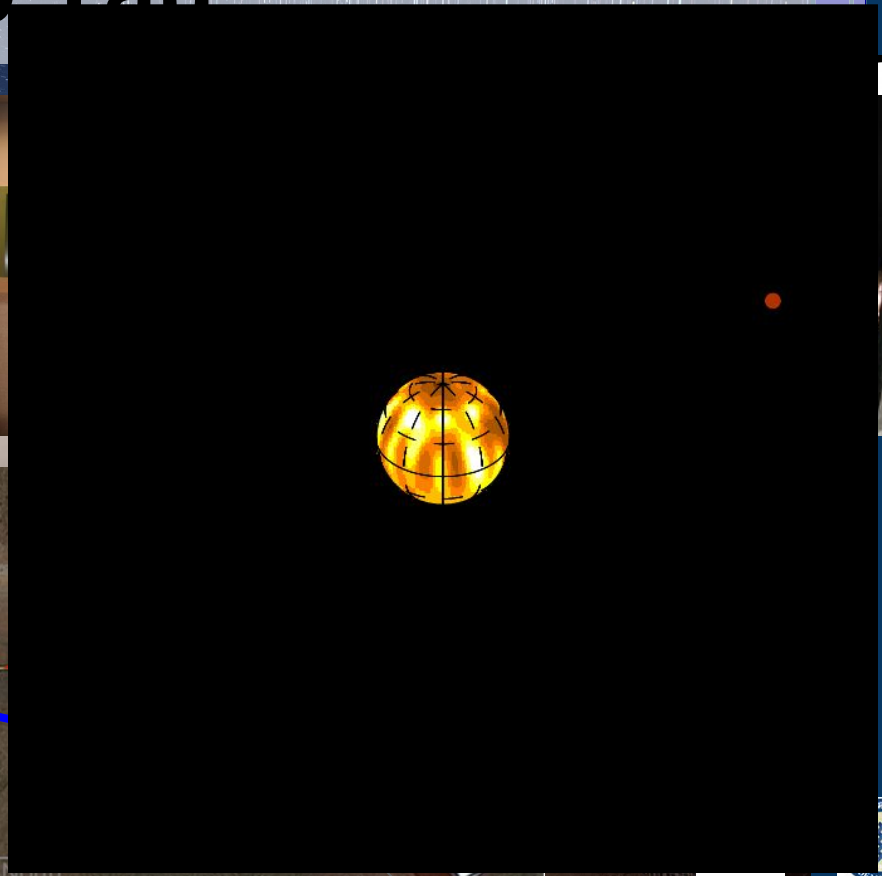


Photo: Sean Goebel

En Conclusion

- SPIRou's biggest strength will be it's hability to lower the astrophysical noise an lower the exoplanet mass limit reachable by the instrument.
- We started the integration of the instrument into our system. The instrument is expected to come at the end of this year and start operations in 2018B.
- Spirou will be allocated a Large Program of 300 - 500 nights that will be spread over 3 - 5 years to perform their main science program. The instrument will also be available for PI science.
- We are exploring the possibility of installing SPIRou on UKIRT to avoid conflicts with the Maunakea Spectroscopic Explorer and to raise the observing efficiency of the instrument.

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