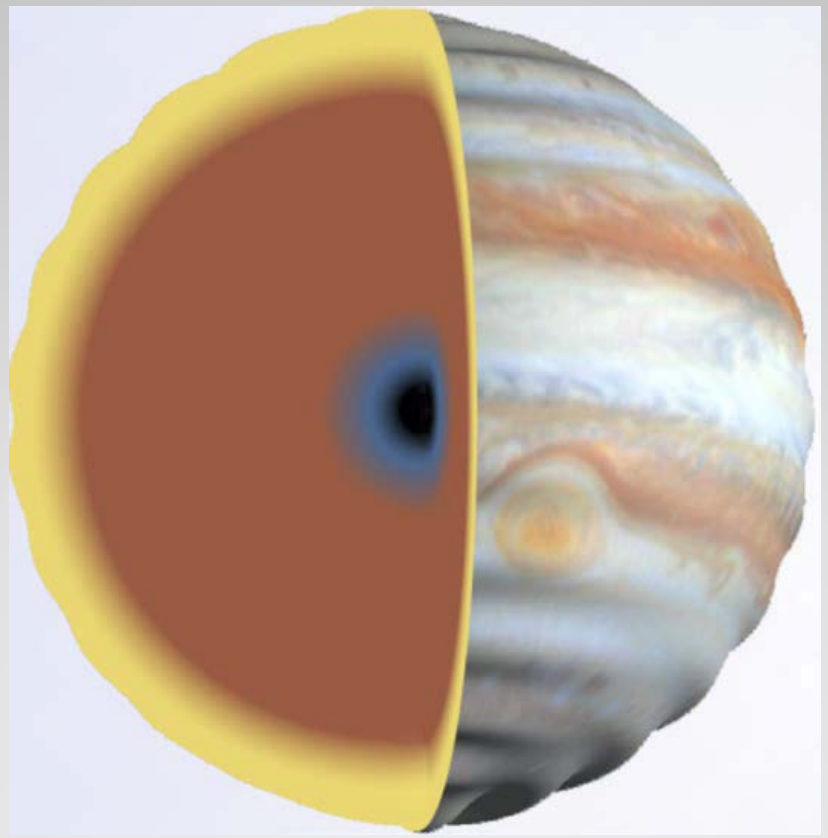
JOVIAL@IAS

Observatoire de la CÔTE d'AZUR

LAGRANGE

IAS Institut d'Astrophysique Spatiale Orsay



NM STATE UNIVERSITY

Japon

Previously : DSI (Doppler Spectro Imager) - ECHOES

IAS
Orsay

Institut d'Astrophysique Spatiale

Organigramme de l'institut d'astrophysique spatiale – UMR8617

DIRECTEUR
Don HASSLER

Directeurs adjoints	Directeur technique	Administratrice	Assistante de direction	Conseil de direction élargi
Karine BOCCHIALINI Marc OLLIVIER	Thierry APPOURCHAUX	Nicole LHERMITTE	Véronique SARRAZIN	

Conseil scientifique

Conseil de laboratoire

Responsable Qualité	Correspondant Formation	Correspondant Communication	CSSI	Assistant Prévention
Sandrine COUTURIER	Patricia JEAUNEAU	Catherine COUGRAND	Hervé BALLANS	Obadias MIVUMBI

Équipes de recherche

- Physique solaire et stellaire
- Matière interstellaire et cosmologie
- Astrochimie et origines
- Physique du système solaire et des systèmes planétaires

Plateformes et services d'observation (SO)

- Station d'étalonnage
  - SO2 : Instrumentation
- IDOC (Integrated Data and Operation Center)
  - SO2 : Instrumentation
  - SO4 : Grands relevés
  - SO5 : Centres de données
  - SO6 : Surveillance du soleil

Services techniques

- Projets spatiaux
- Electronique
- Mécanique thermique
- Optique
- Informatique
- Laboratoires de physique

Service administratif

- Gestion financière
- Ressources humaines
- Logistique
- Bibliothèque Sec Enseignements
- Gestion projets et équipes

Commissions

- Bibliothèque
- Administration
- Informatique
- Communication

Chargés de missions

- Cellule communication
- Patrimoine
- Séminaires
- Suivi doctorants

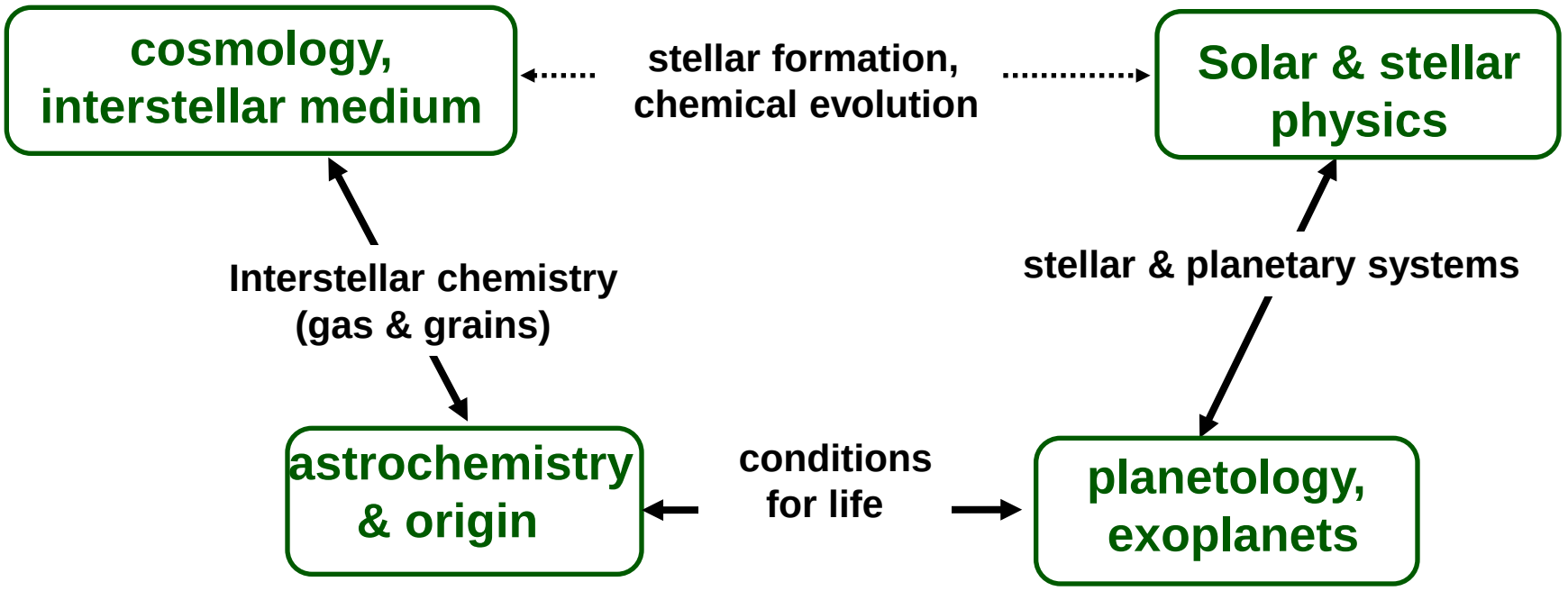
thématiques scientifiques

univers promordial grandes structures, formation stellaire, évolution de la matière

Space data (+ground), modelling

vent solaire, turbulence, astérosismologie

Space data modelling



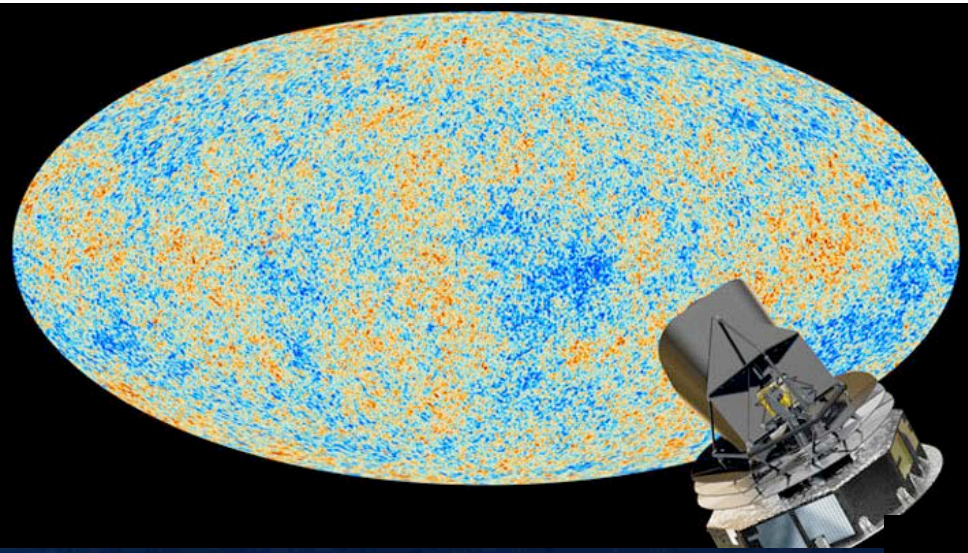
laboratory experiments, space data (+ground)

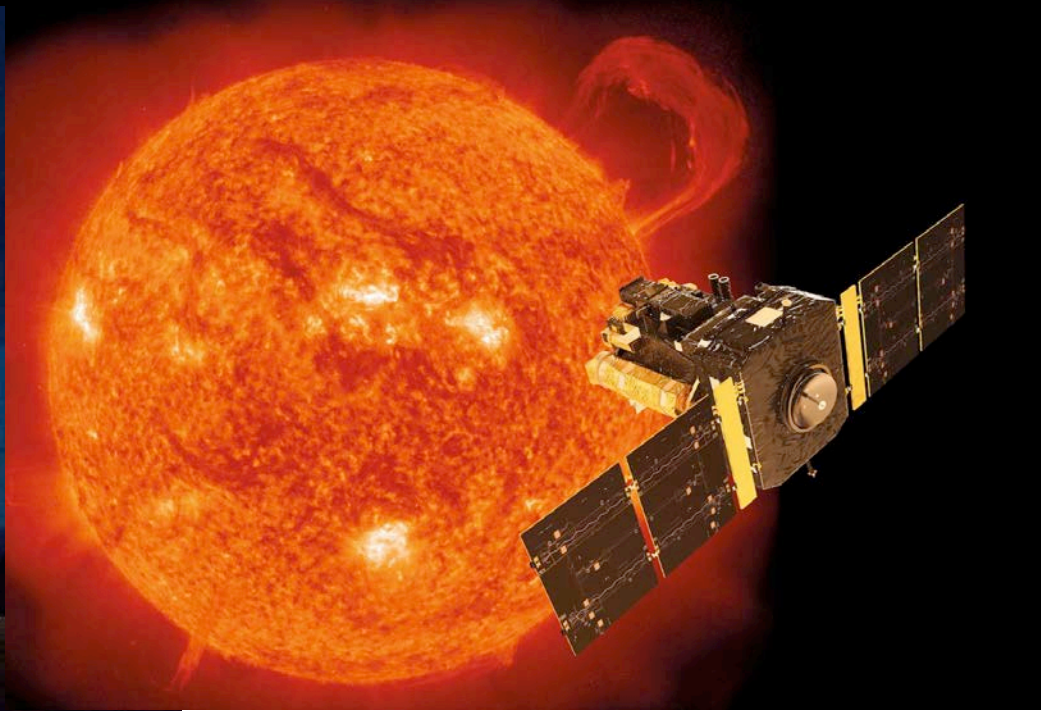
origine et évolution de la matière

Space data modelling

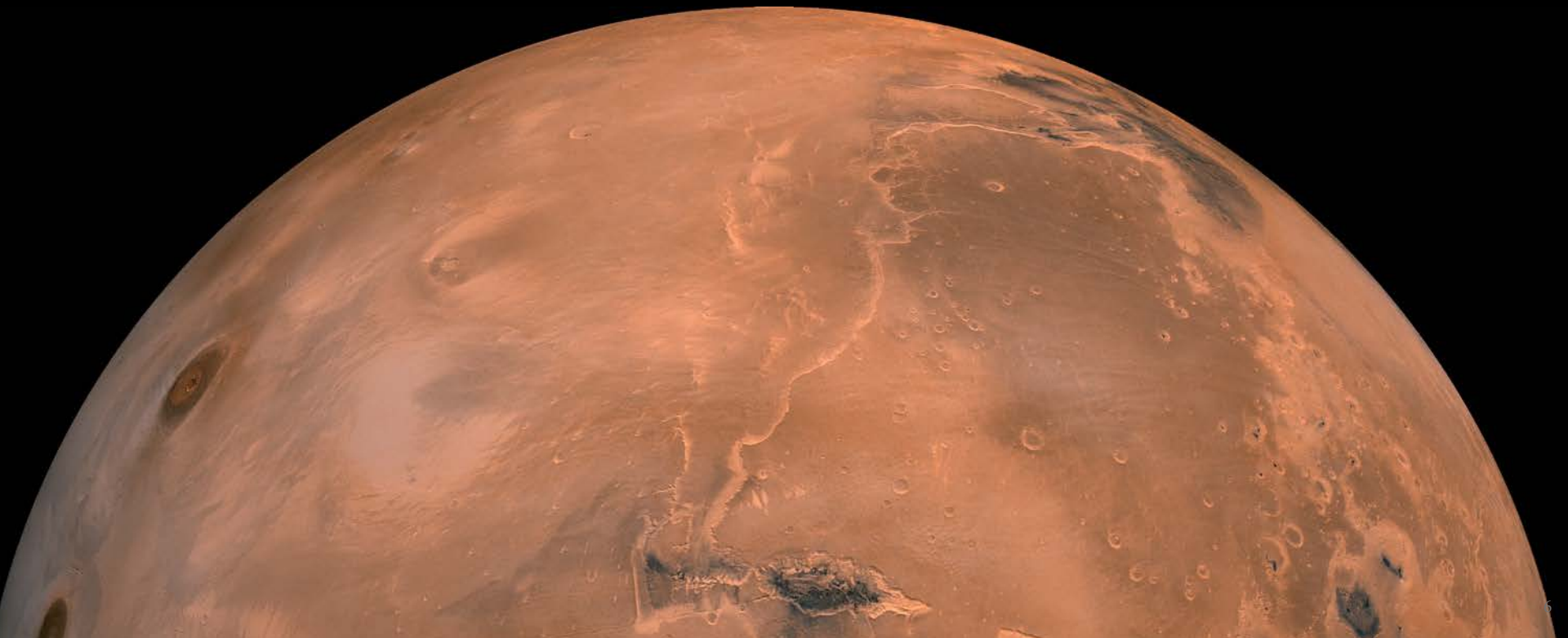
origine et évolution des systèmes planétaires ; planétologie comparée

Some projects





Team
Système Solaire et systèmes planétaires



Solar system and planetary systems

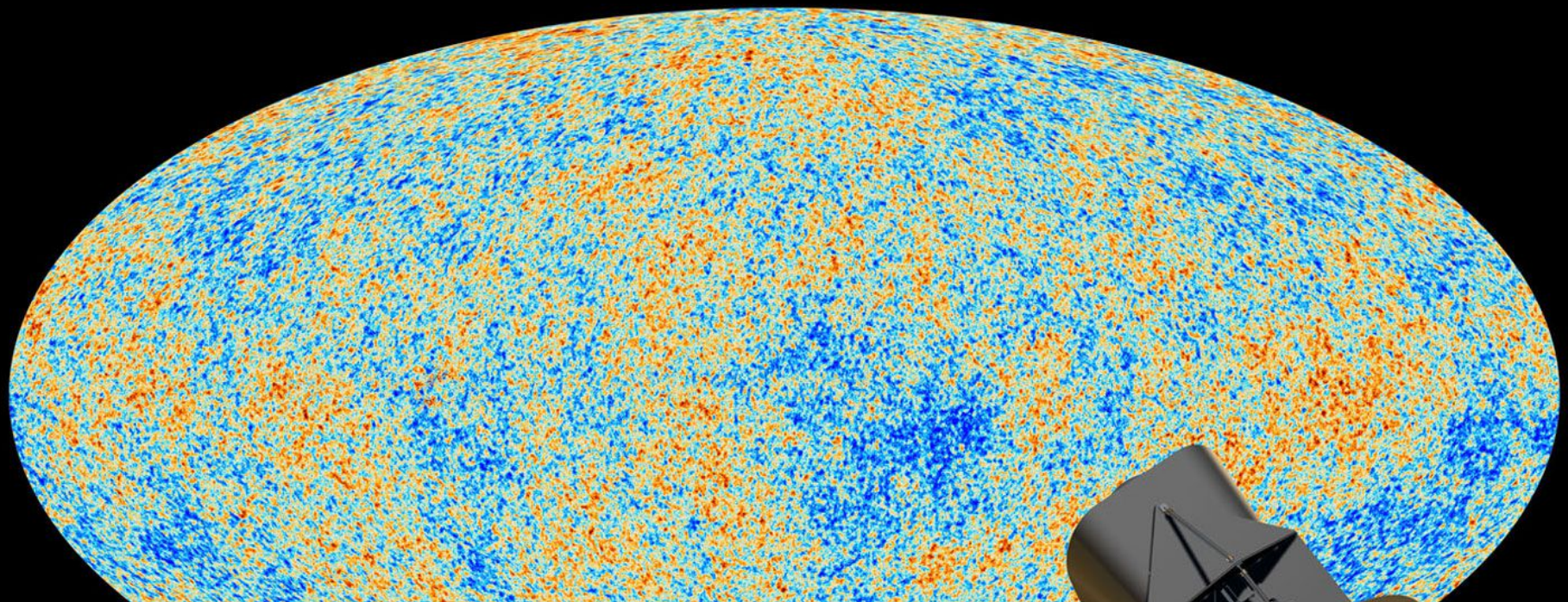
Formation and evolution

Dans la diversité des approches que nous mettons en œuvre, nos activités visent à contribuer à la

caractérisation des processus responsables de la

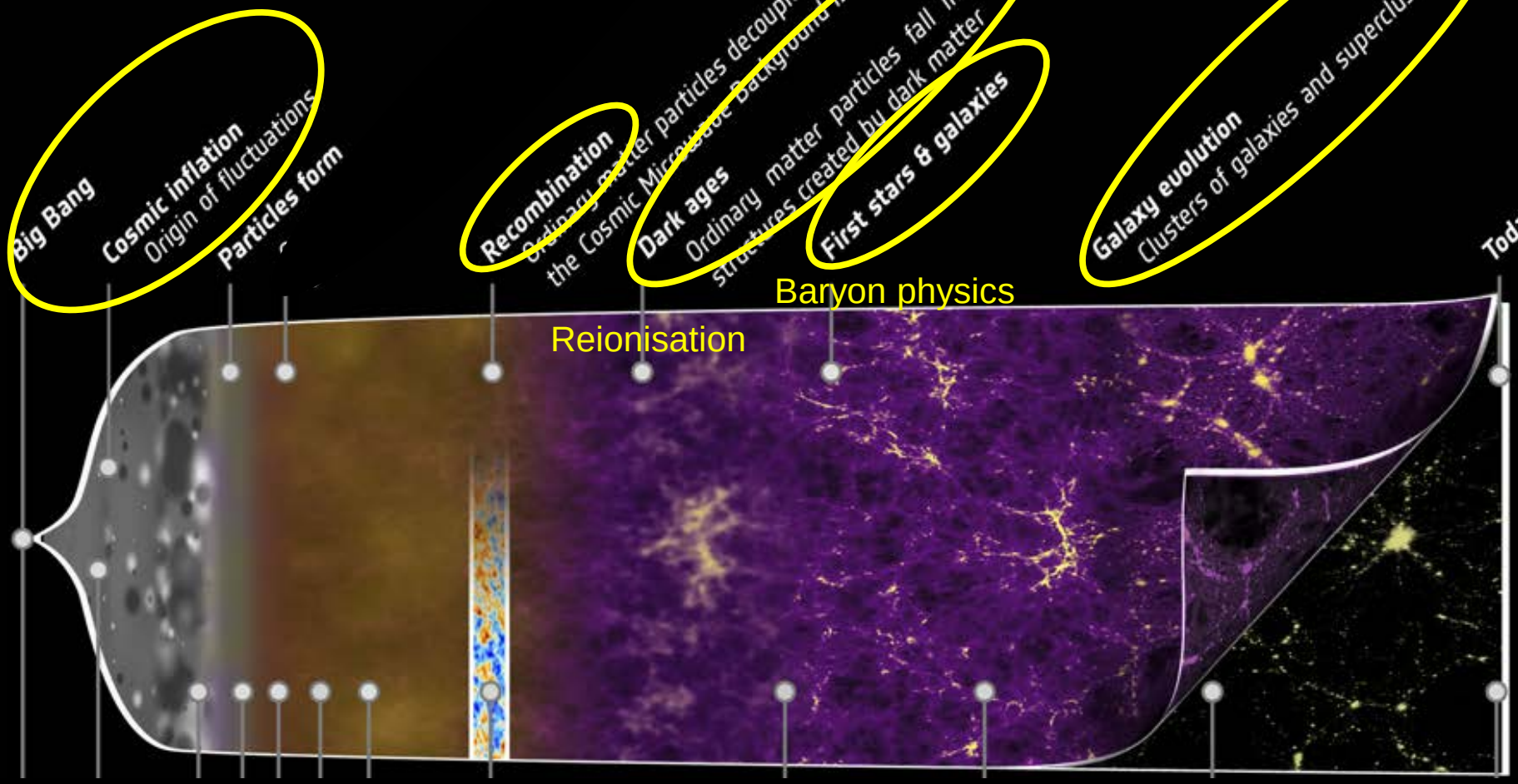
- formation et de l'évolution du système solaire,
- formation et de l'évolution des systèmes planétaires,
- formation et de l'évolution des objets qui les constituent.

Team
Matière Interstellaire et Cosmologie



Physical cosmology and cosmic structures

Primordial universe

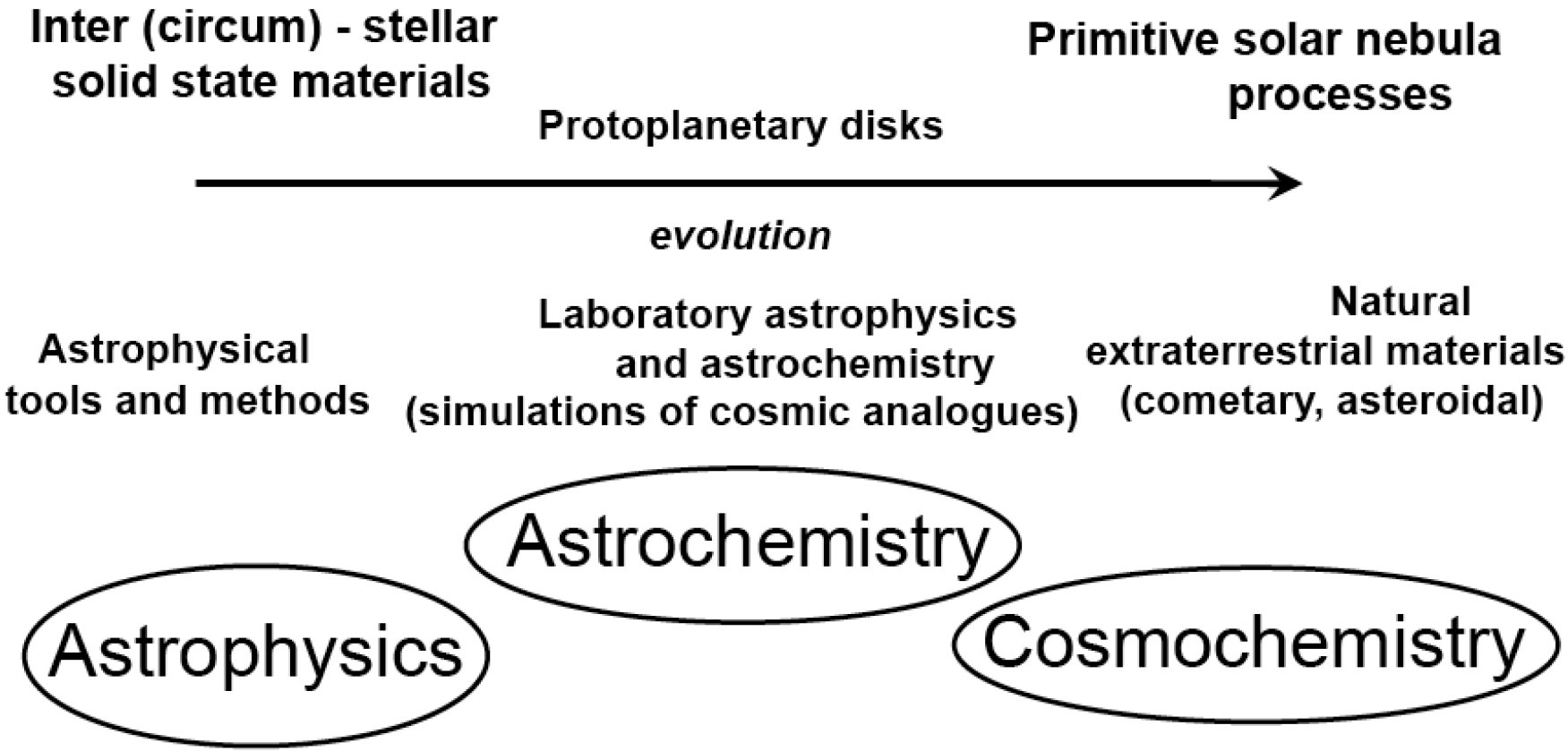


Data: Planck, Herschel, ALMA, ESO, IRAM, Spitzer

Approaches: Observation, data analysis, modeling, theory

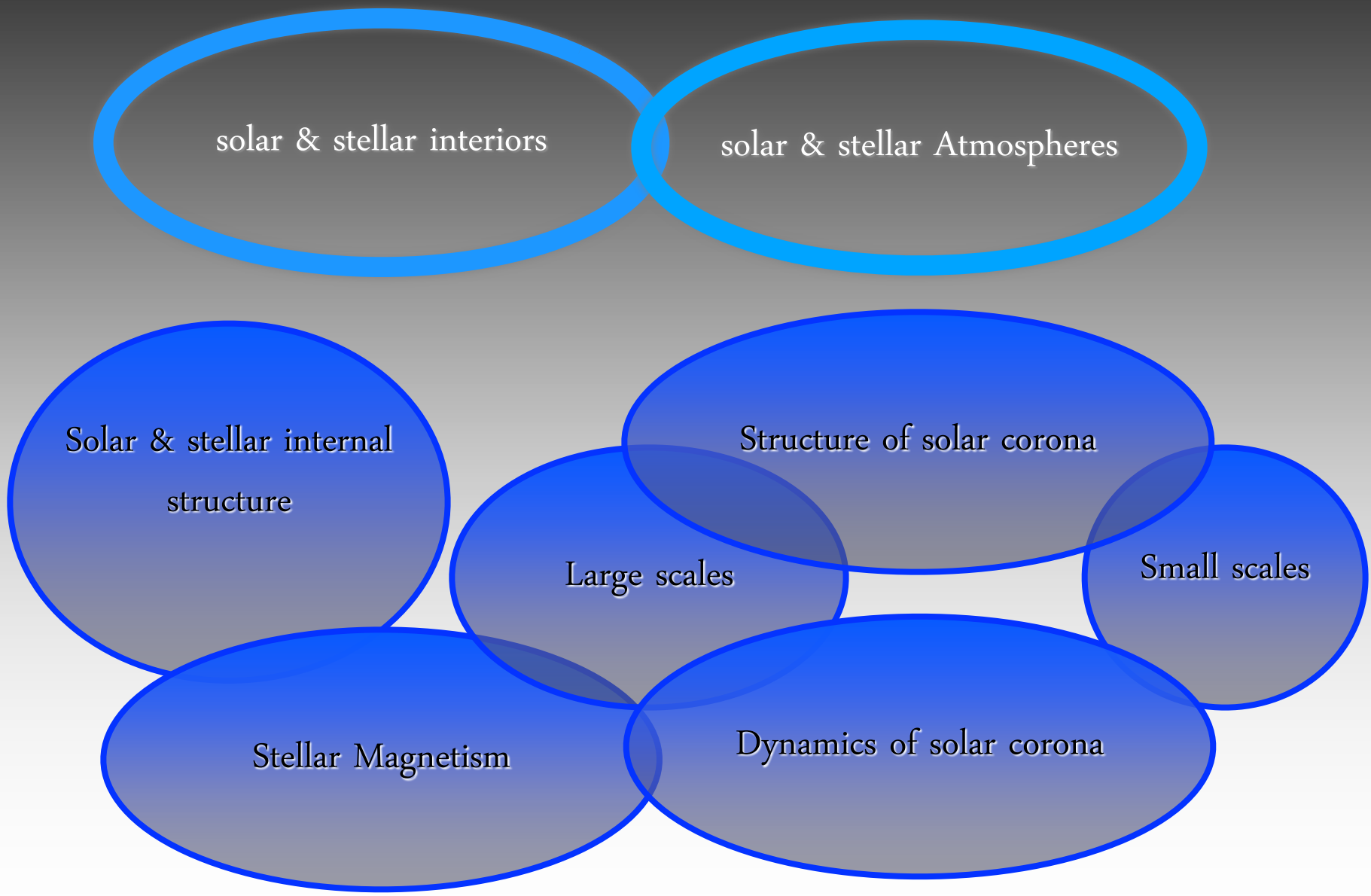
Team
Astrochimie et Origines

Astrochimie et Origines



Team
Physique solaire & stellaire:

Scientic topics of the team



Calibration facility for space instruments

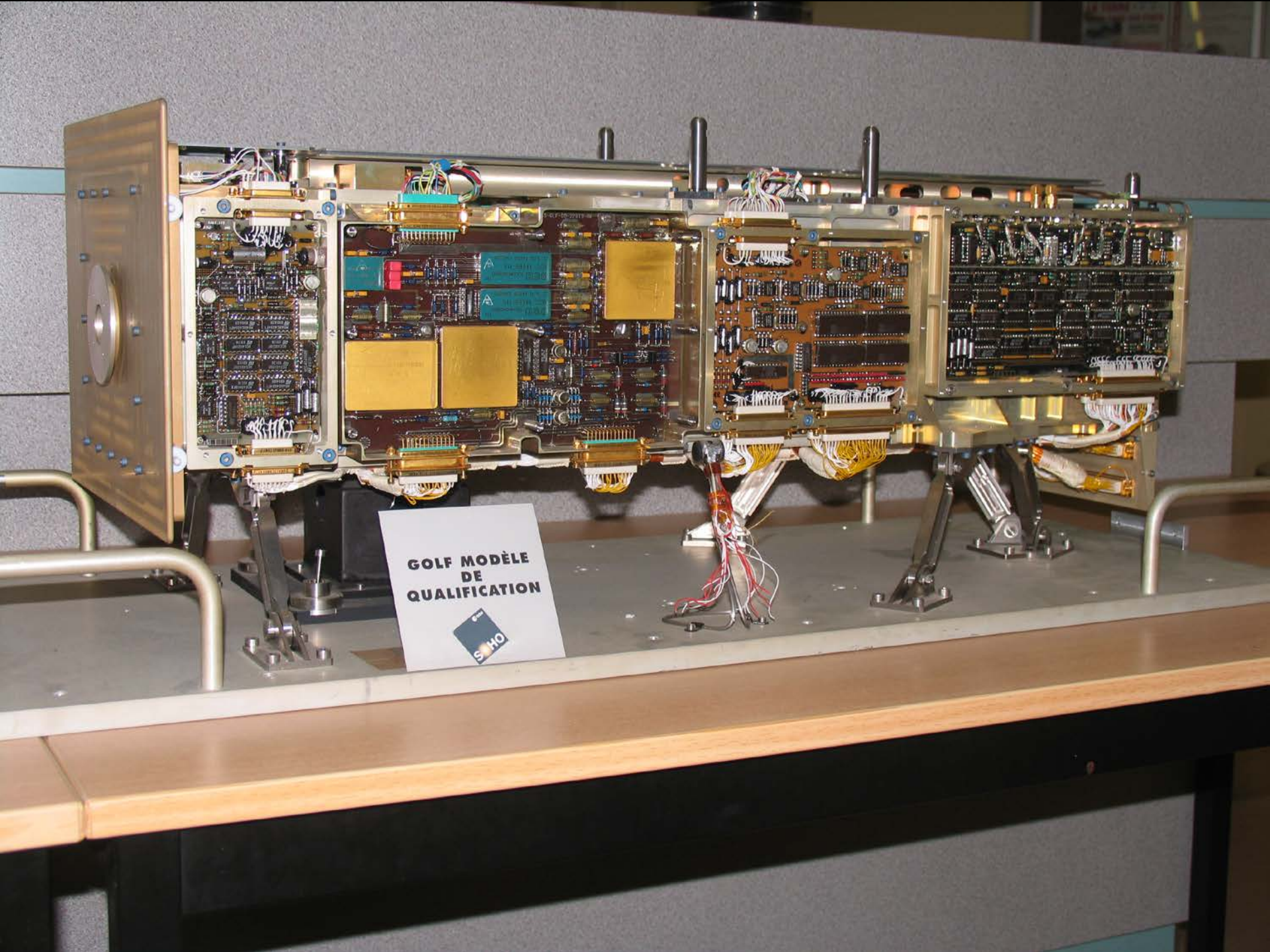
- Reproduce physical conditions that the instruments will face in space: space simulators.
- Cleanliness, vaccuum, thermal systems, harness, computers, … and incoming light for calibration.
- Vibration platform system

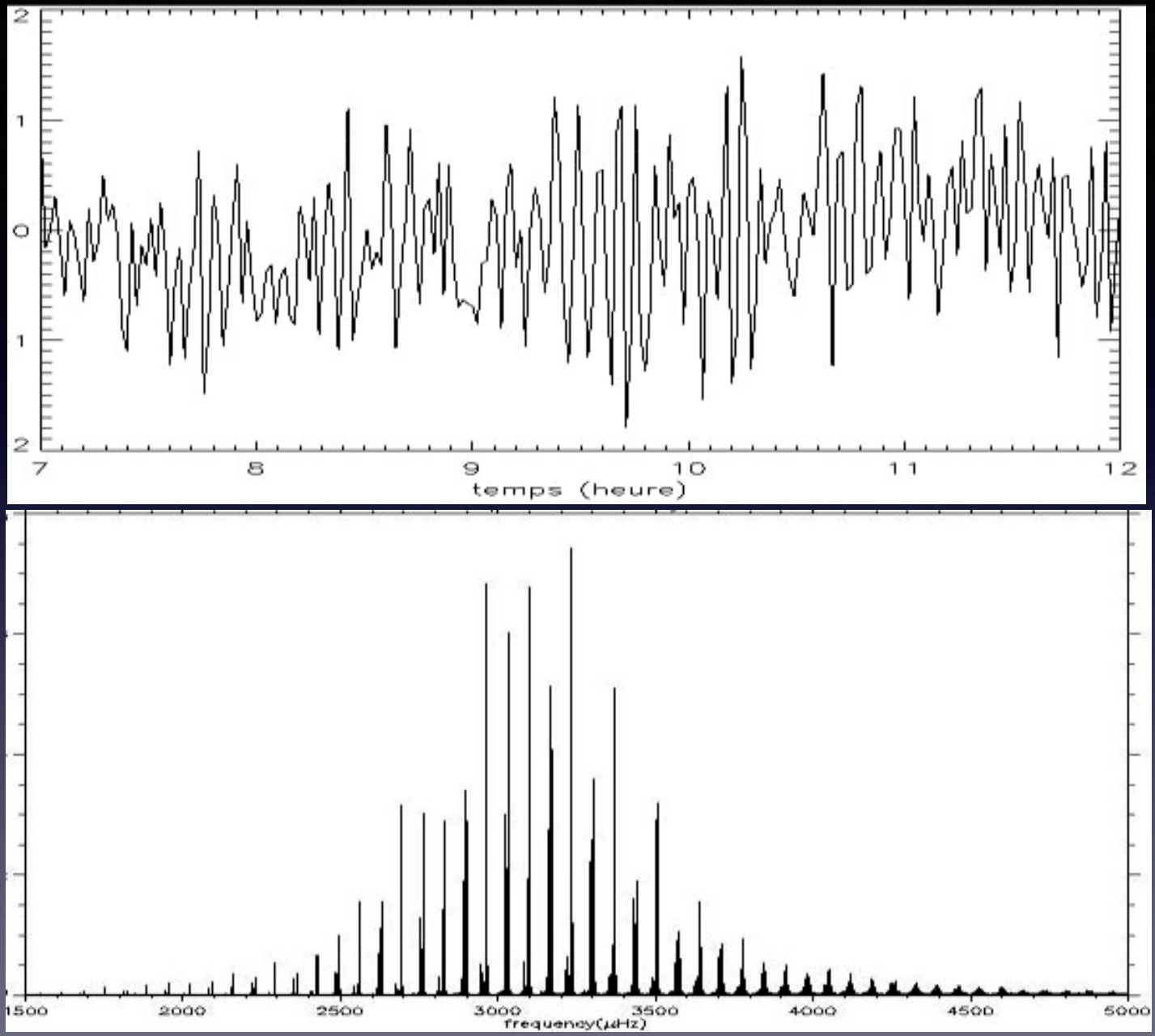
IDOC Center

- IDOC Center for space data and operations (IAS Data and Operation Center) is a facility which allows:

- Commanding and monitoring space instruments.
- Data reduction, analysis and archiving of data. Interface for data access, open to national and international communities (cf talk F. Baudin).

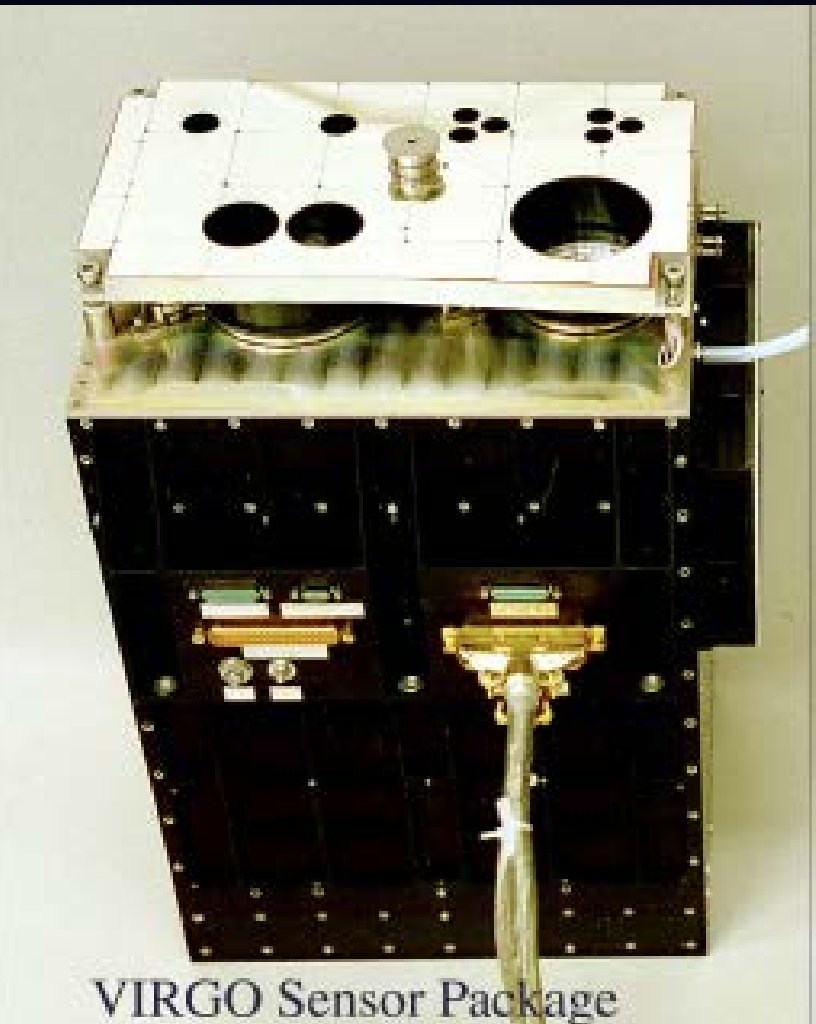
Exemples of solar/stellar instruments for which IAS was or is involved


GOLF MODÈLE
DE
QUALIFICATION
SOHO

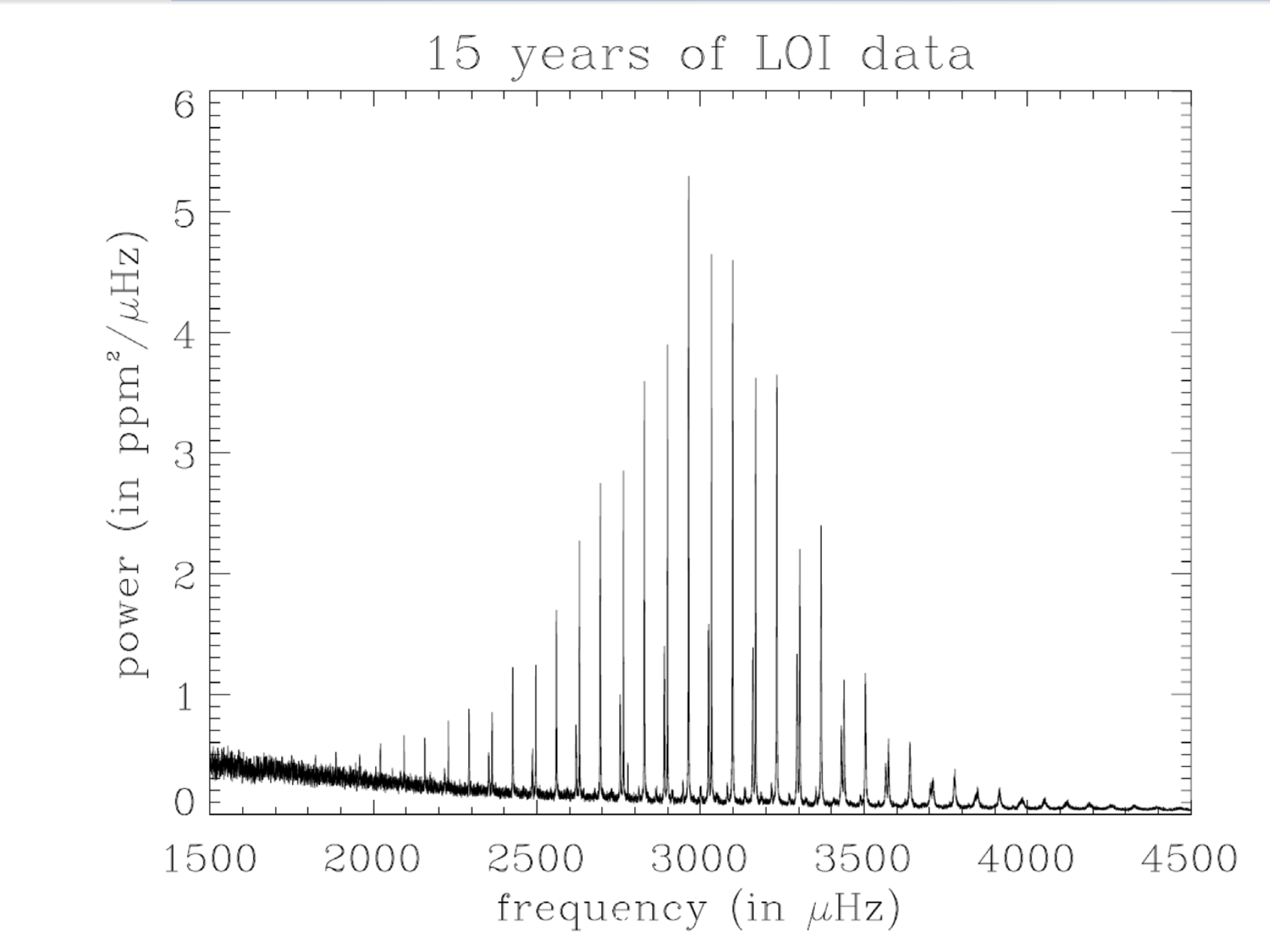


Velocity residuals (above) and power spectral density (below)

LOI-VIRGO / SoHO



VIRGO Sensor Package

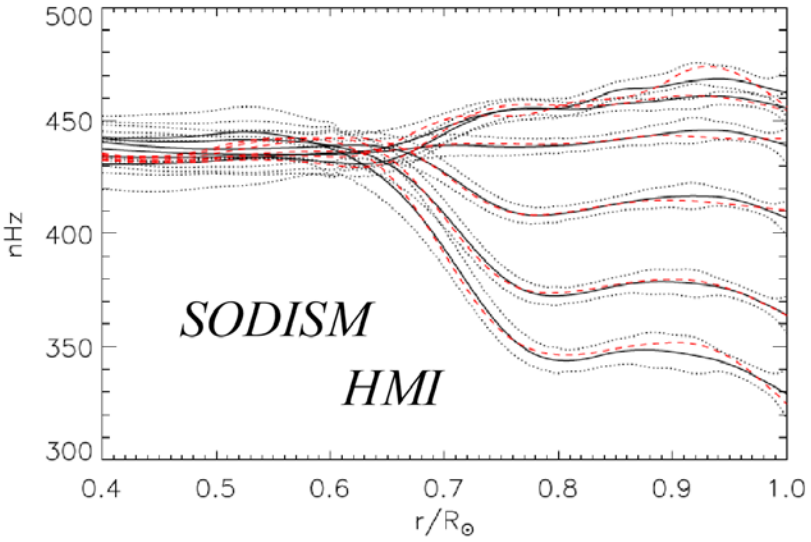

15 years of LOI data
power (in ppm²/μHz)
0
1
2
3
4
5
6
1500
2000
2500
3000
3500
4000
4500
frequency (in μHz)

Main results of PICARD for seismology

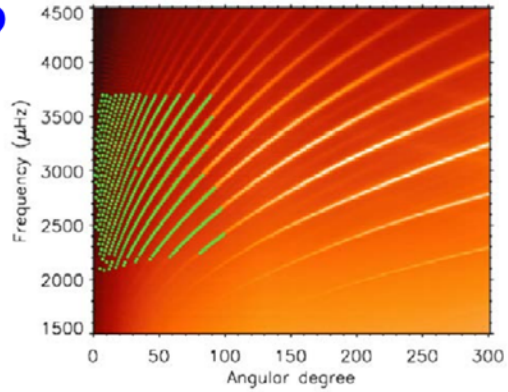
Les principaux résultats de la mission PICARD

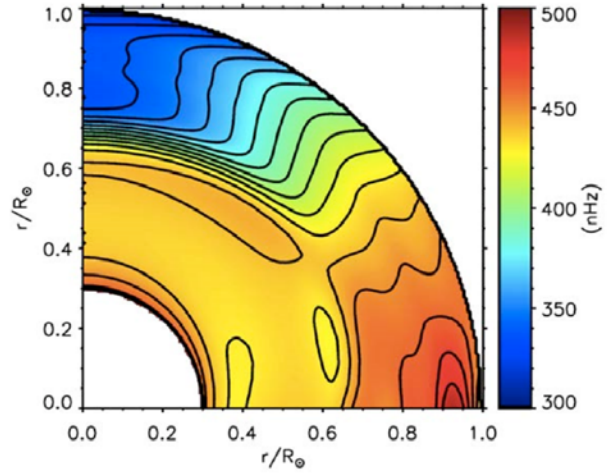
- L'héliosismologie

- Détection des modes p, non-détection des modes g



Rotation solaire interne de l'intérieur radiatif à la photosphère pour les latitudes allant de 0°, 15°, 30°, 45°, 60° et 75° de haut en bas.

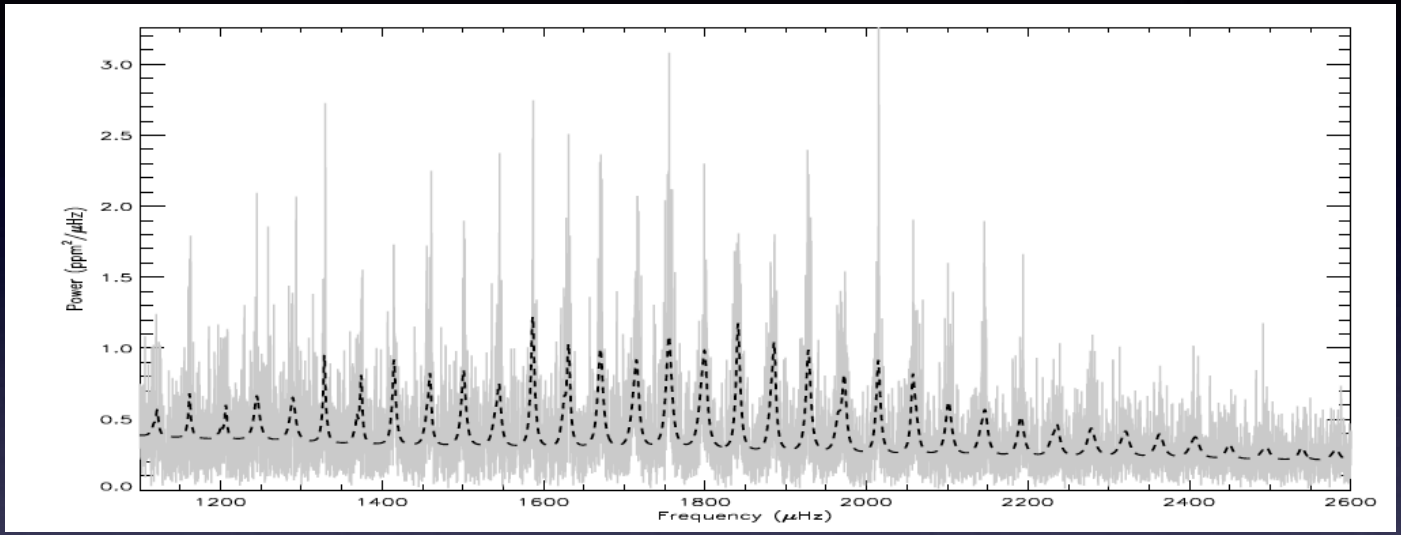


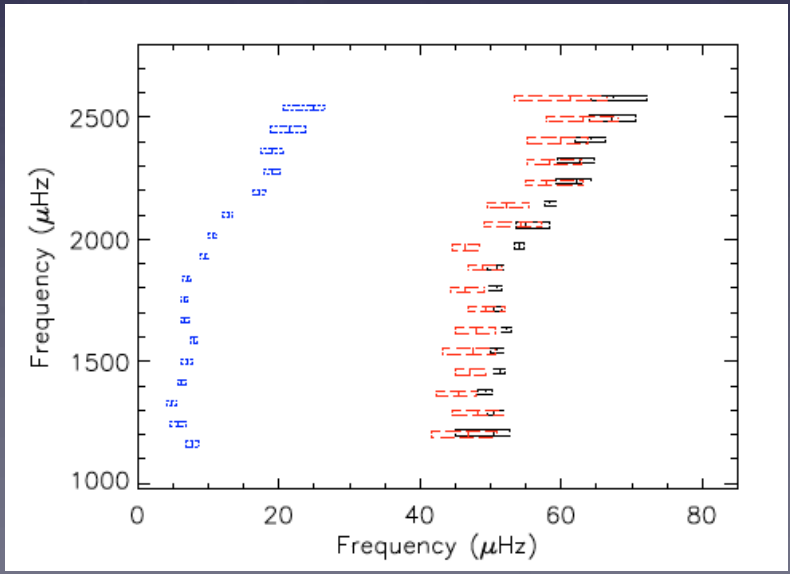


Corbard, Salabert, Boumier et al., 2013

Internal structure of stars

CoRoT : 1st seismic analysis of a solar like pulsator





=> HD 49933:

M = 1.19 M_0

Age ~ 3.2 10^9 an

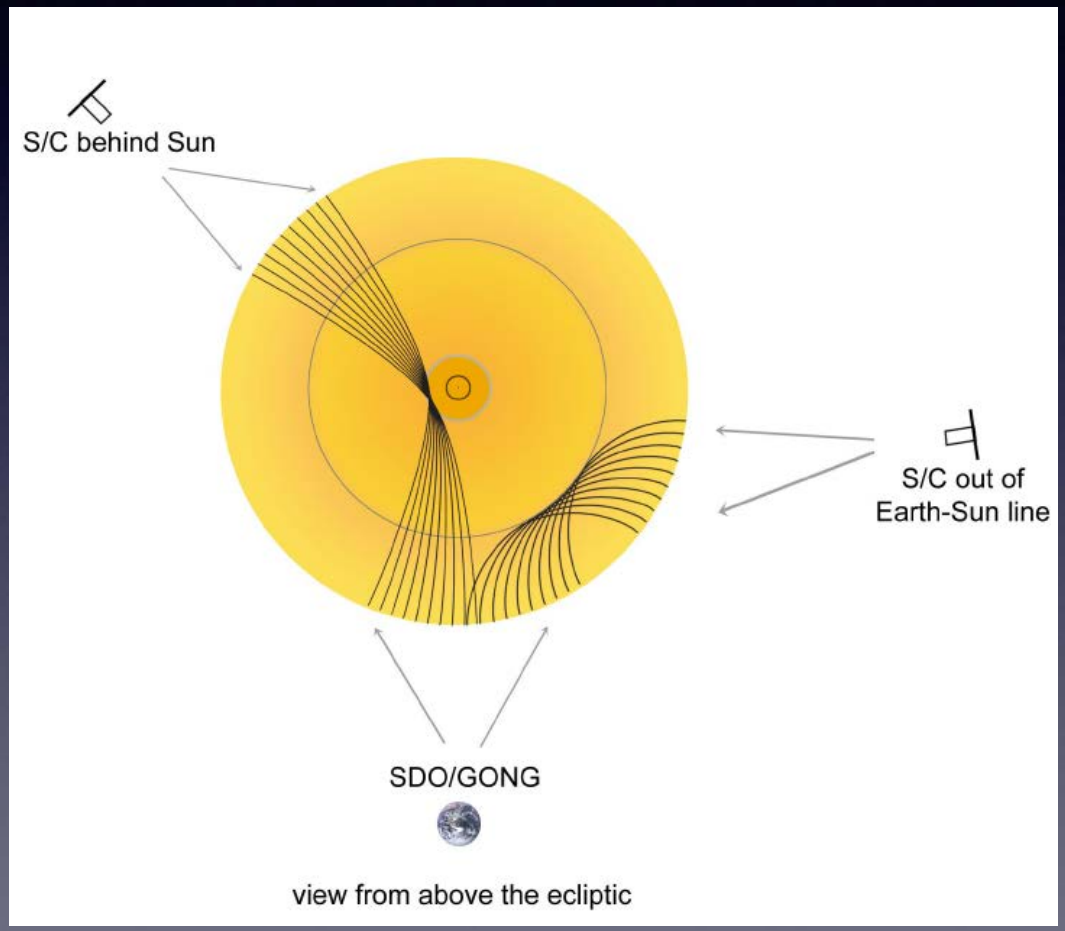
Appourchaux et al. 2008

Benomar et al. 2009, 2010

SO/PHI

Internal structure of the Sun

IAS lead co-I, resp. filtergraphe

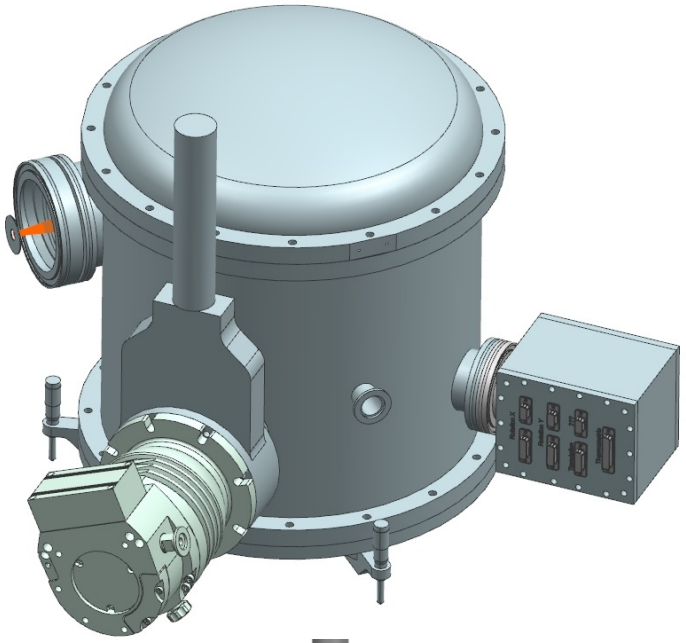


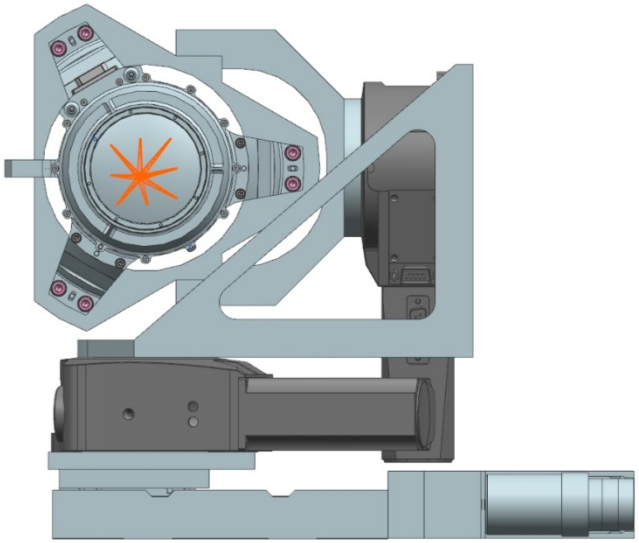
Importance of the pôles:
- Meridian circulation
- rotation différential rotation at high latitude
- B extrapolation

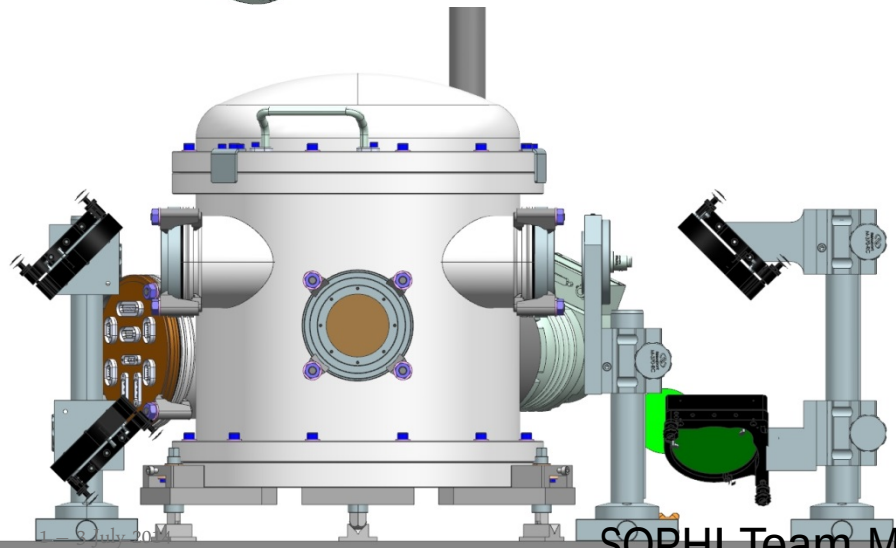
+ seimic probe of the tachocline (stéréo obs.)

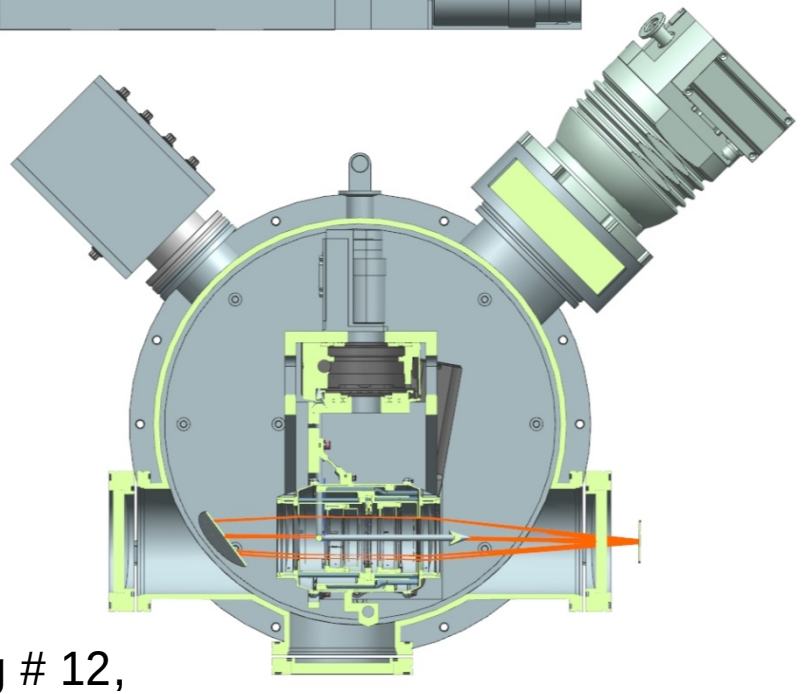
=> dynamo effect

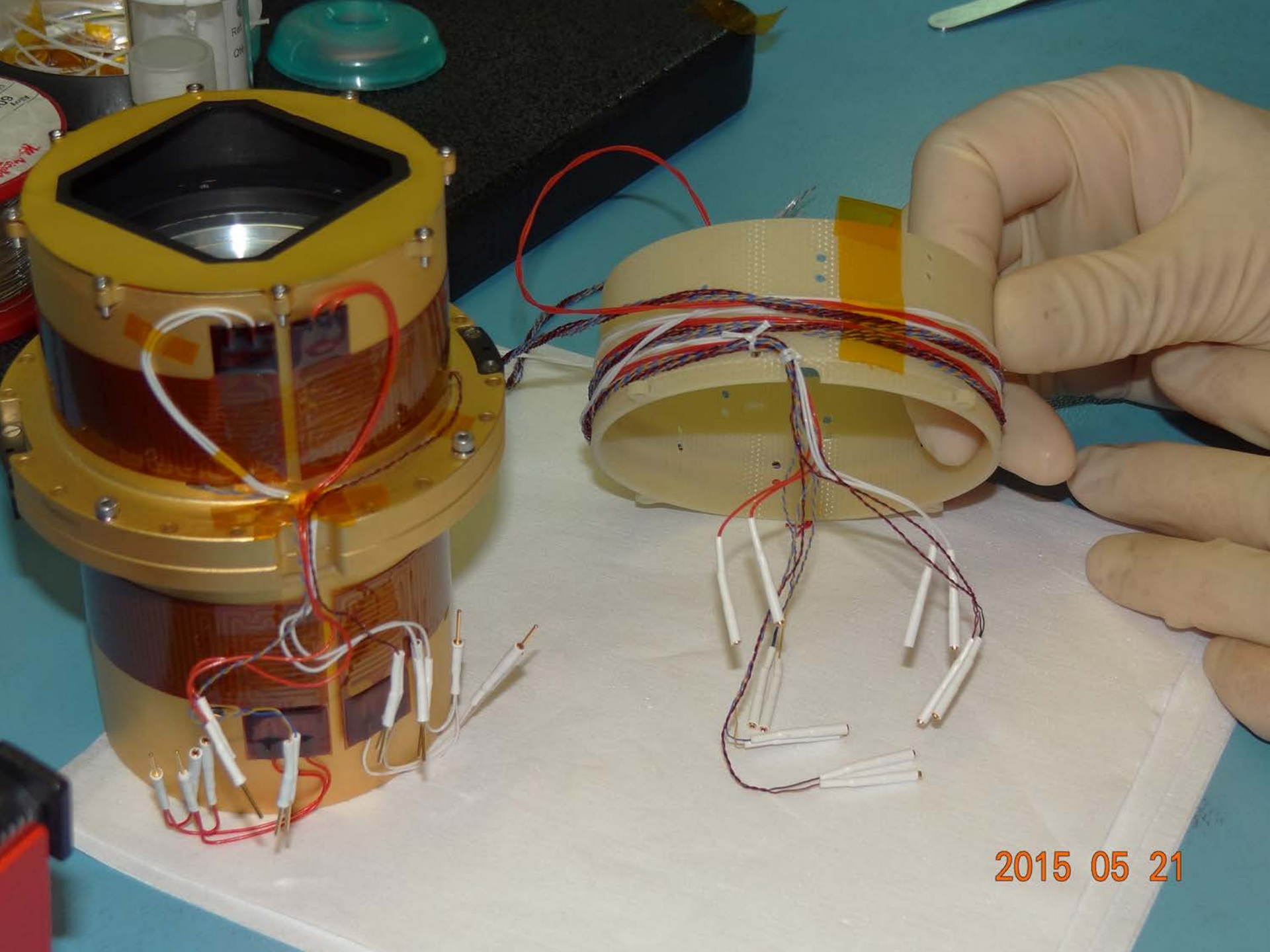
Vacuum chamber







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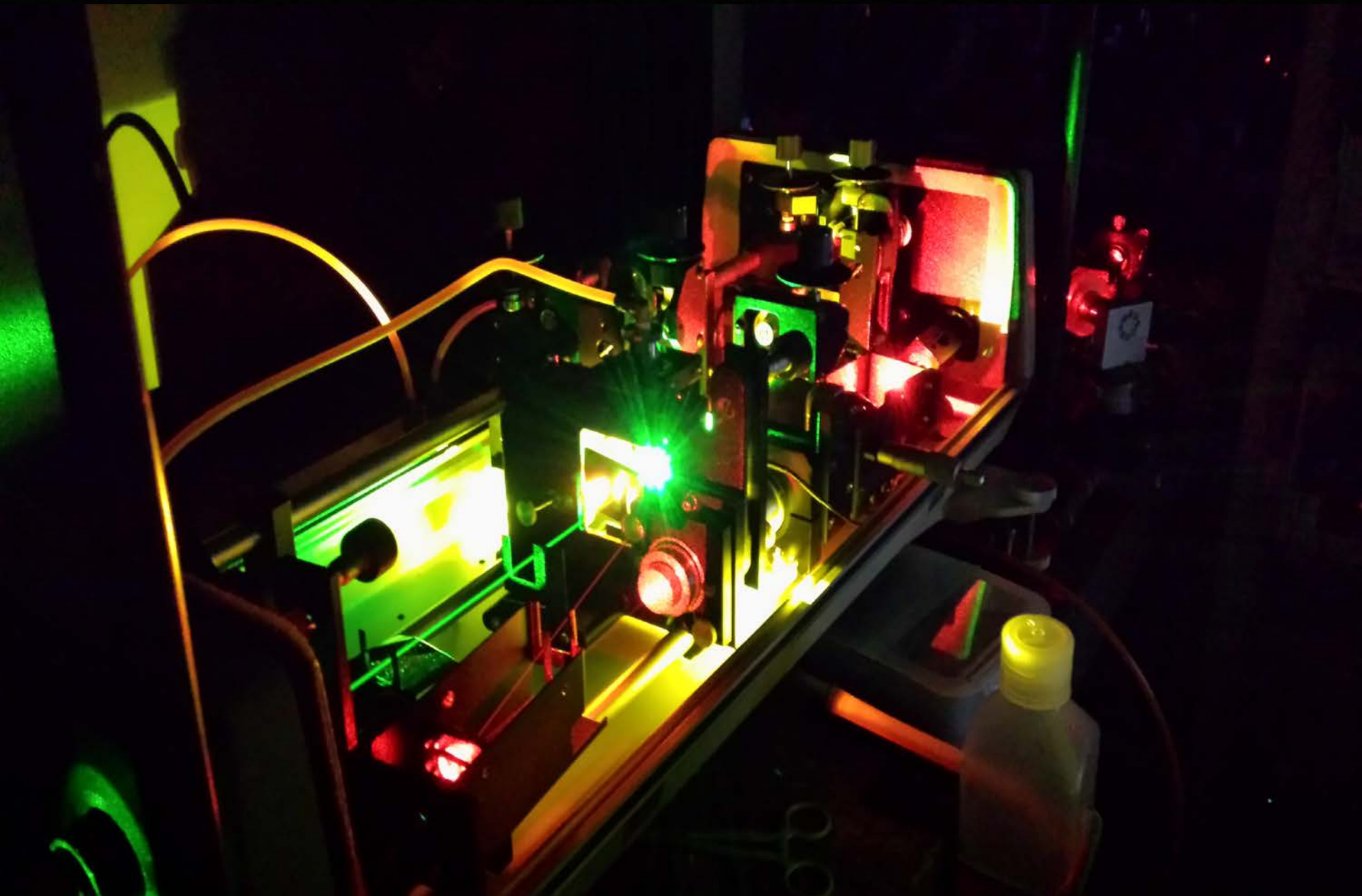
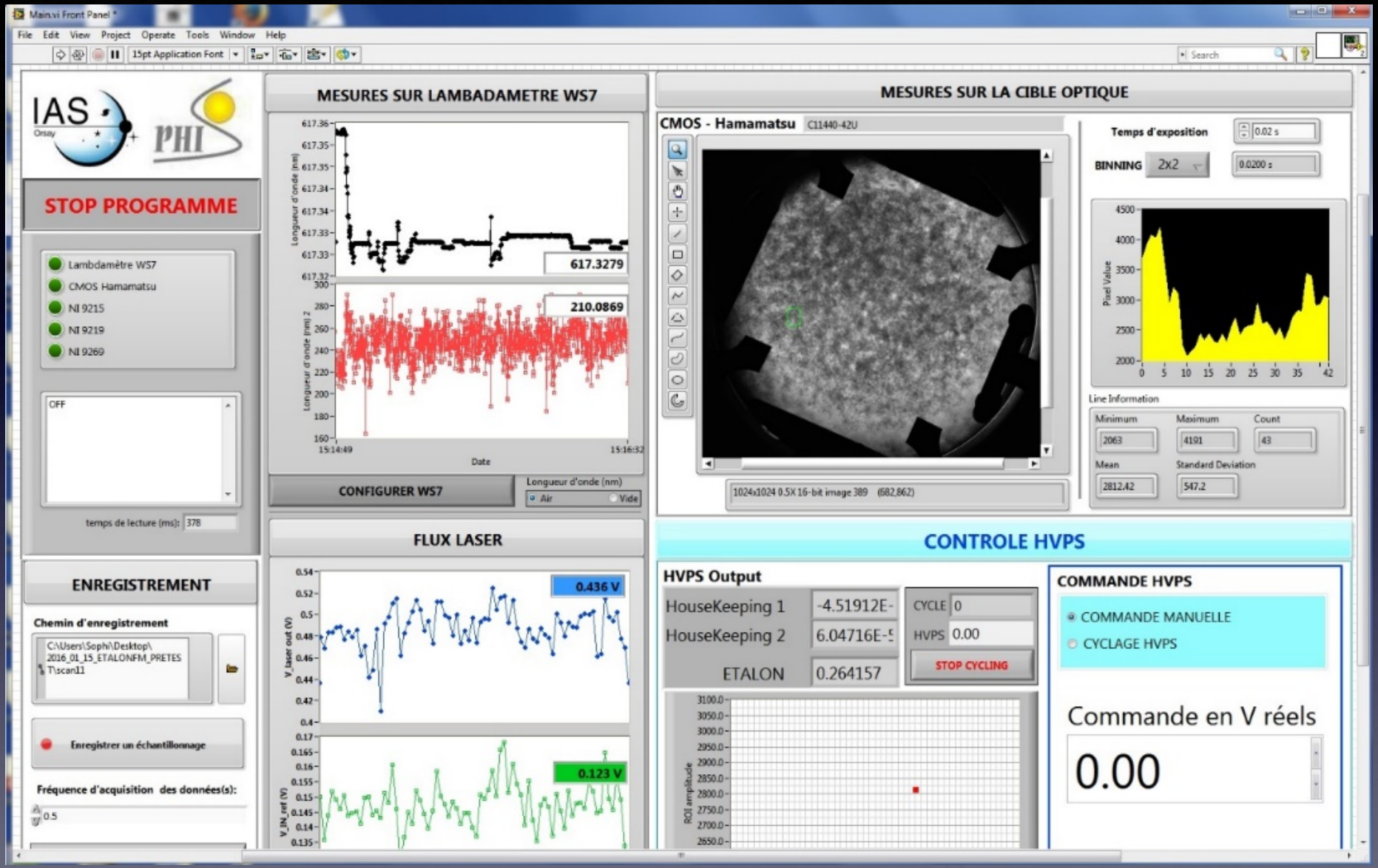
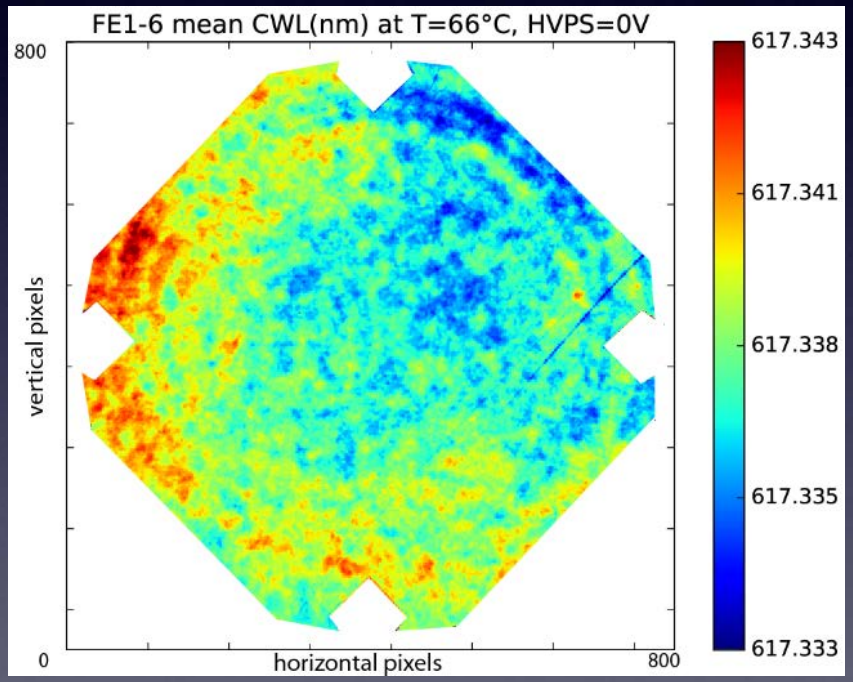
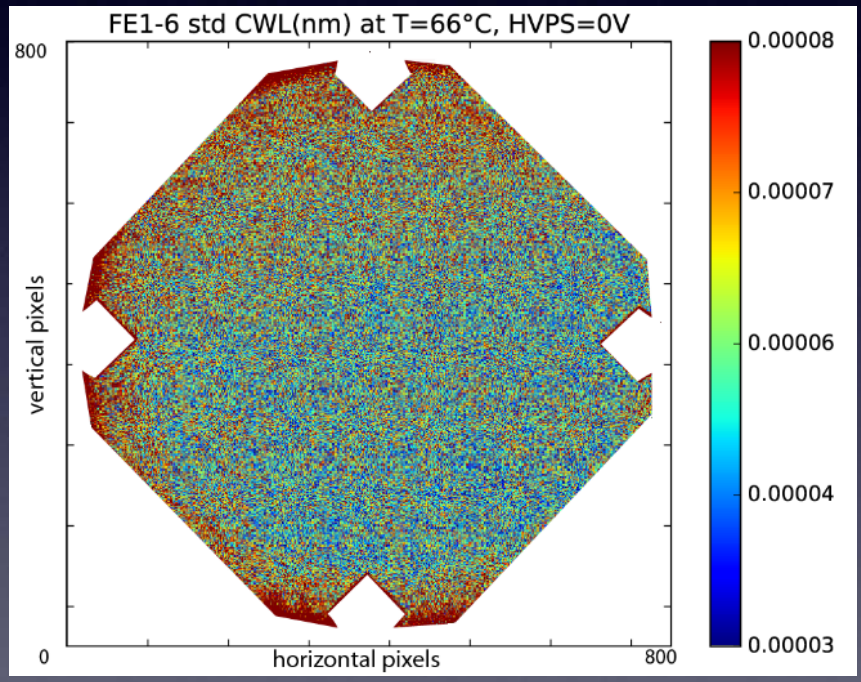




DATA CUBE ACQUISITION INTERFACE: A FITS IMAGE IS ACQUIRED FOR EACH MEASUREMENT WAVELENGTH AND VOLTAGE.

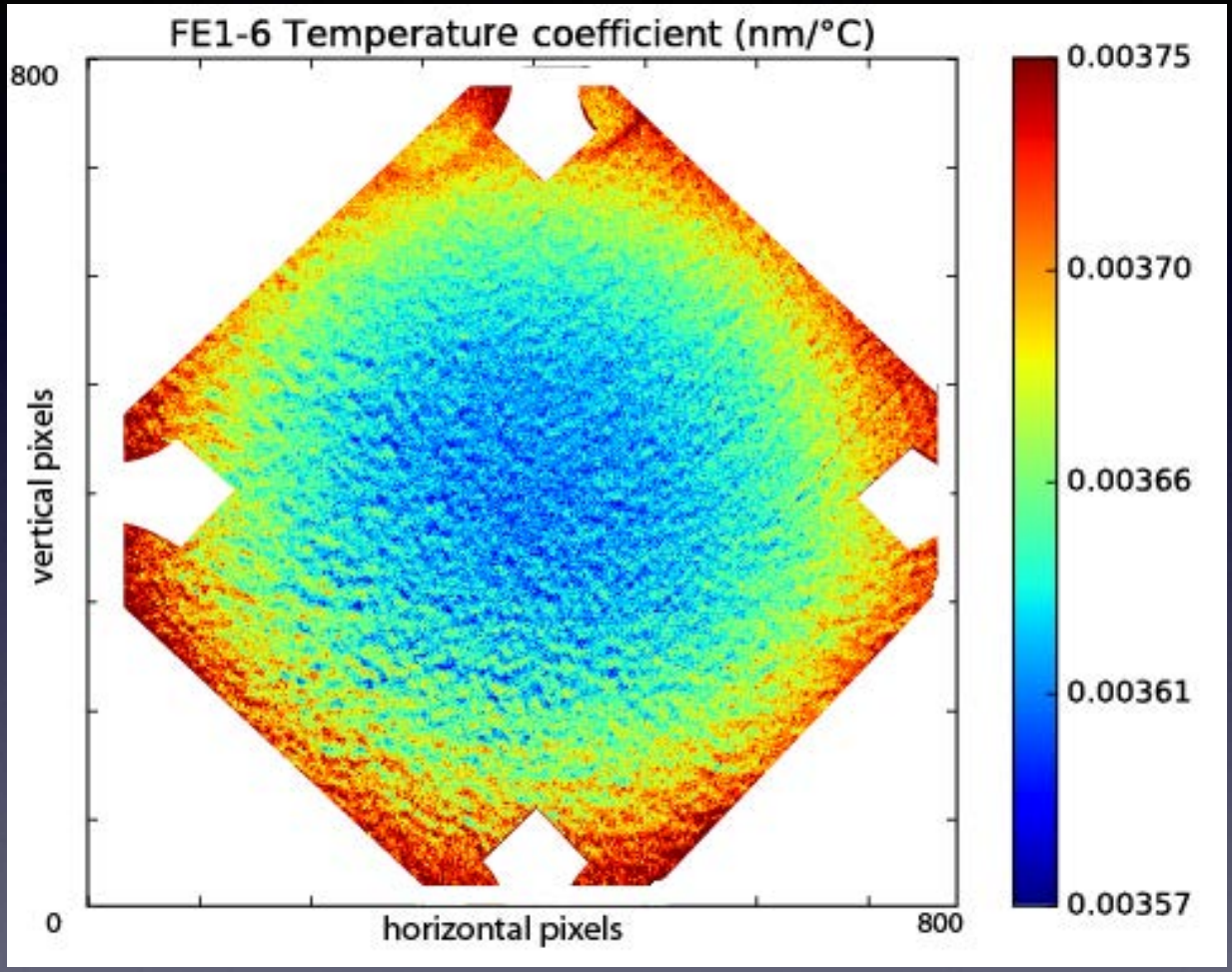
Transmission map of the filtergraph





MAPS OF THE MEAN OF 6 CWL DATA CUBES (LEFT) AND THEIR STANDARD DEVIATION (RIGHT). THE MEAN IN AIR WAVELENGTH VALUE IS 617.32431 ± 0.00006 NM.

Temperature sensitivity map



Temperature coefficient (nm/°C) map: mean value (inside the encircled area) is 0.003646 ± 0.000053 nm/°C.

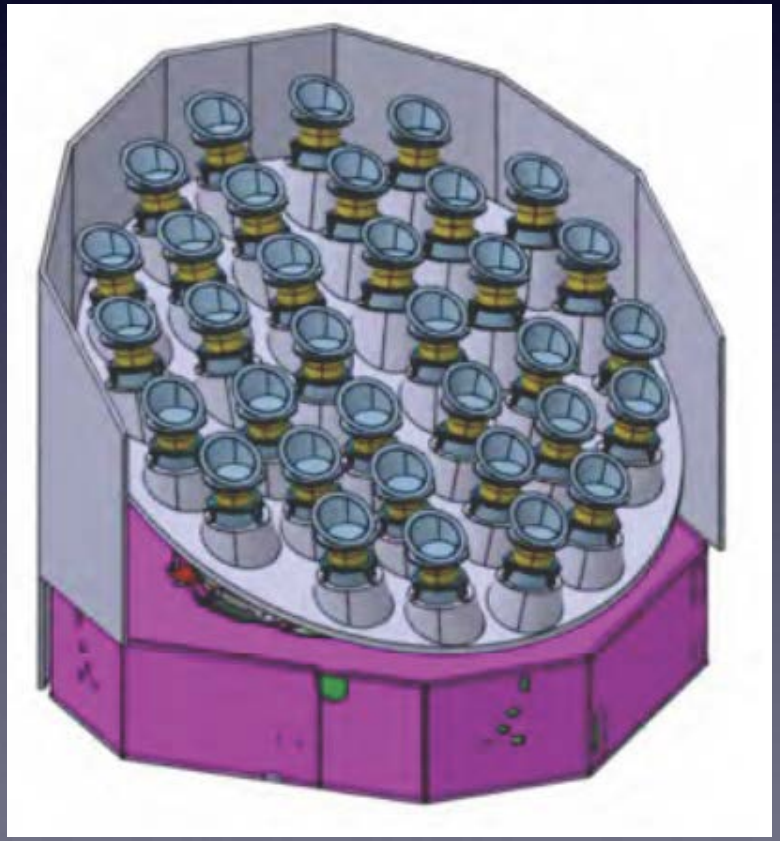
Internal structure of stars

PLATO

Member of PLATO Board
Resp. for Stellar Analysis System & tests of the cameras

Ulta high precision photometry for caracterisation of stellar systems

- 34 cameras => Field 2200 deg^2



DSI@IAS

Science participation (T. Appourchaux, P. Boumier, P. Gaulme…) & Design (JC. Leclech, G. Morinaud, F. Rouesnel…)

DSI_Intrument.pdf

DSI_R&T.pdf

JOVIAL@IAS

- **Instrumental expertise; data analysis & archiving:**

Appourchaux Thierry, Baudin Frédéric, Boumier Patrick

- **Mecanical-thermal design; vaccuum tank; archive:**
Le Clec'h Jean-Christophe, Ballans Hervé, Langlet François.

talk F. Baudin & J.C. Le Clec'h