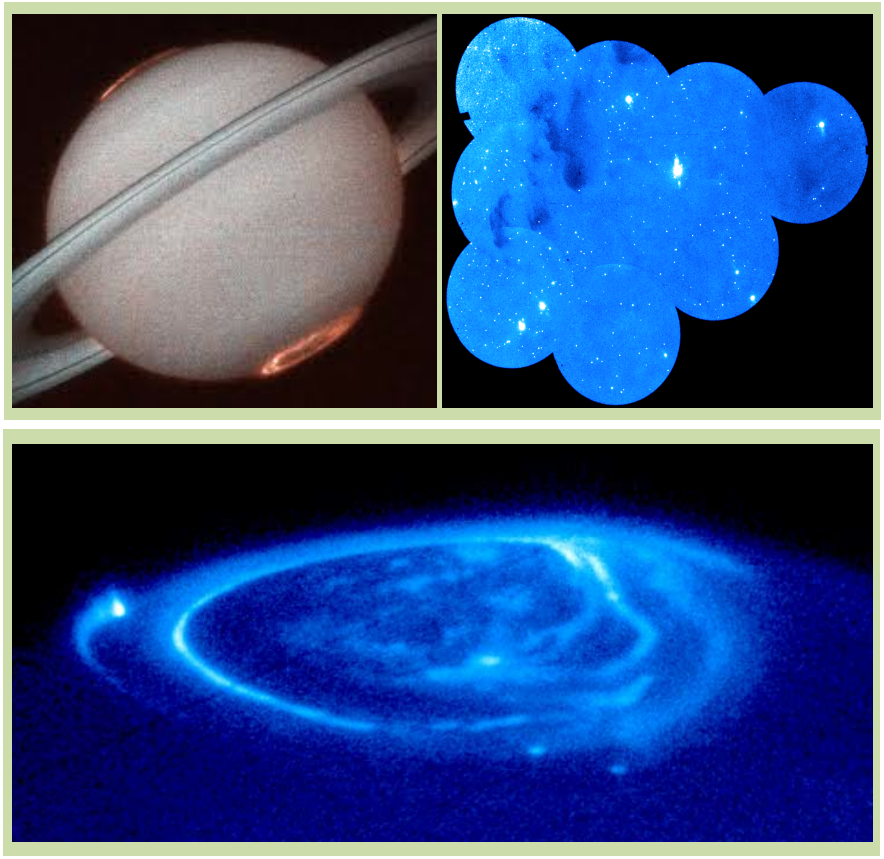

THE WSO-UV MISSION AND THE ACCESS TO THE UV RANGE FOR ASTRONOMICAL PURPOSES IN THE NEAR FUTURE

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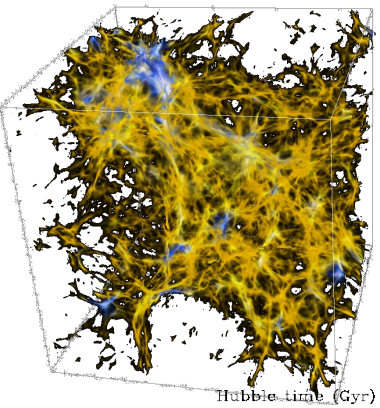
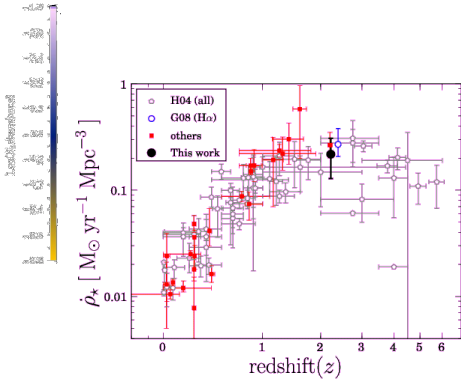
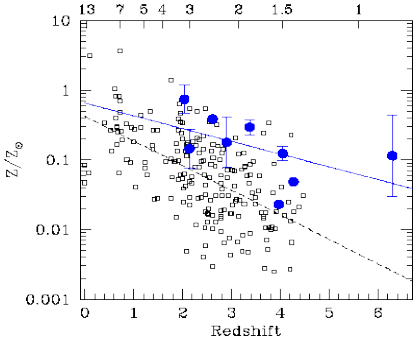
Universidad Complutense de Madrid
AEGORA Research Group

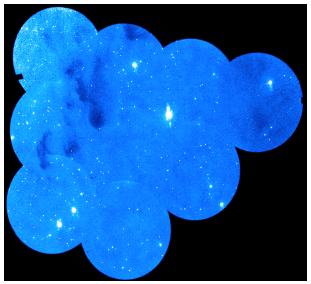
KEY SCIENCE TO BE ADDRESSED IN THE UV

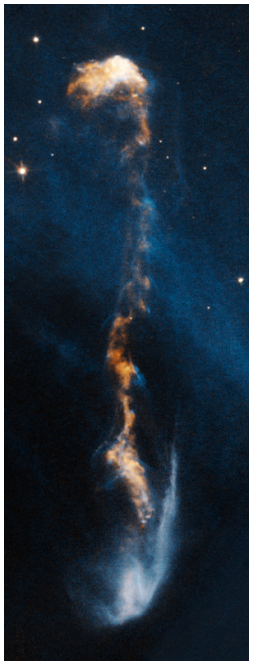
- transport processes in the intergalactic medium over 80% of the universe lifetime
- the interstellar medium (ISM)
- planet formation and the emergence of life
- the solar system
- stellar physics
- fundamental physics – testing the variation of the fine structure constant at z<2

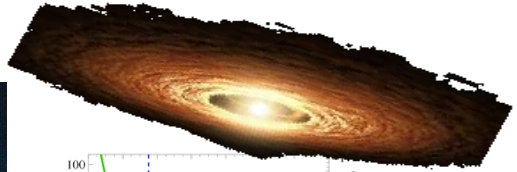


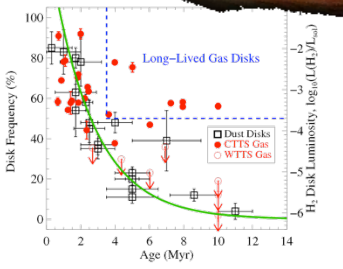


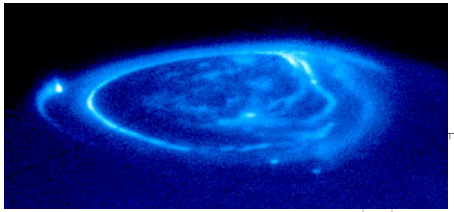


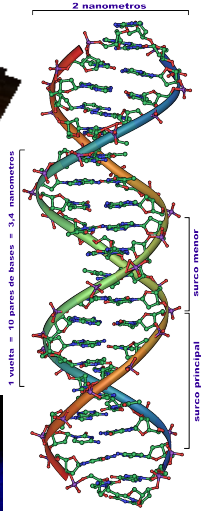


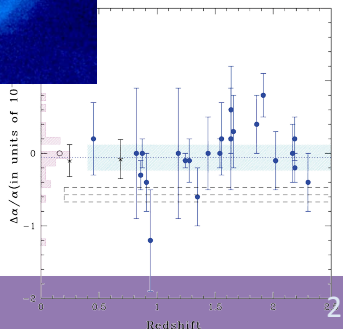












UV ASTRONOMY MISSIONS

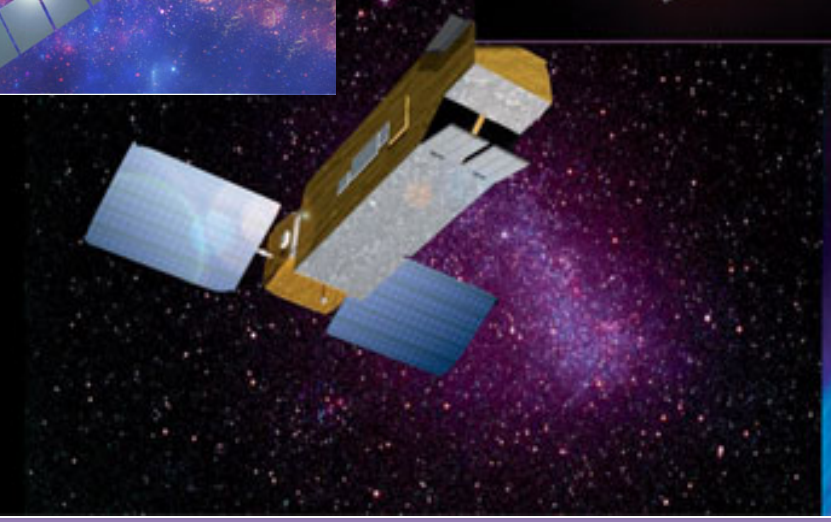
OAO-3
Copernicus
1972-1981

IUE
International Ultraviolet Explorer
1978-1996

HST
Hubble Space Telescope
1986...

FUSE
Far Ultraviolet Spectroscopic Explorer
1999-2007

GALEX
Galaxy Evolution Explorer
2003...



The WSO-UV mission

B. Shustov, A.I. G'omez de Castro and the WSO-UV team

ESO/NUVA/IAG Workshop on Challenges in UV Astronomy, ESO Garching, 7-11 October 2013

"Spektr" (Спектр) missions for astrophysics

The Russian Federal Space Program 2006-2015 includes 3 cornerstone missions:

SPECTRUM-R : Space-Earth radio-interferometry –
- launched 2011

SPECTRUM-X: X-ray survey mission incorporating e-ROSITA – Russia-Germany
- launch is planned for 2014

SPECTRUM-UV: (also known as WSO-UV) incorporating ISSIS – Russia-Spain
- launch is planned for 2016

WSO-UV at a glance

TELESCOPE: T170M – 1.7m primary – f/10

SPECTROGRAPHS: WUVS (R=55,000 & R=1200)

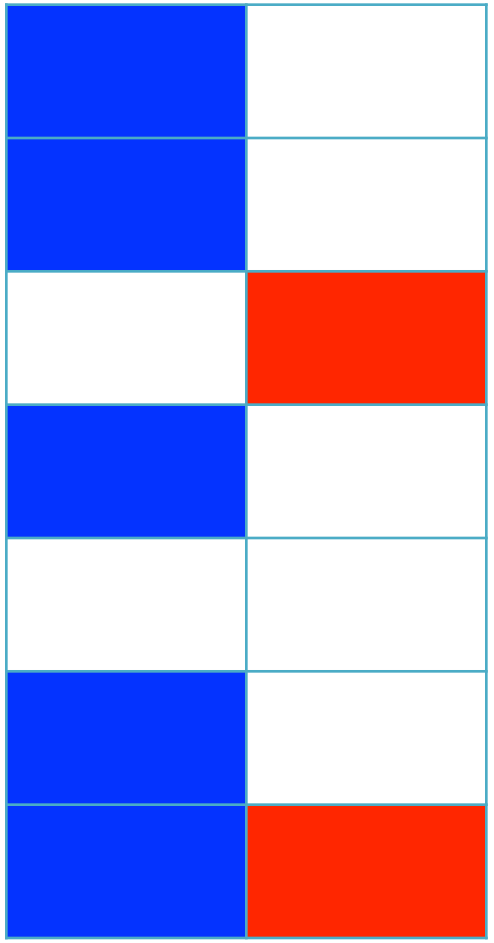
IMAGER: ISSIS (<0.1 arcsec, FoV:1.3 arcmin)

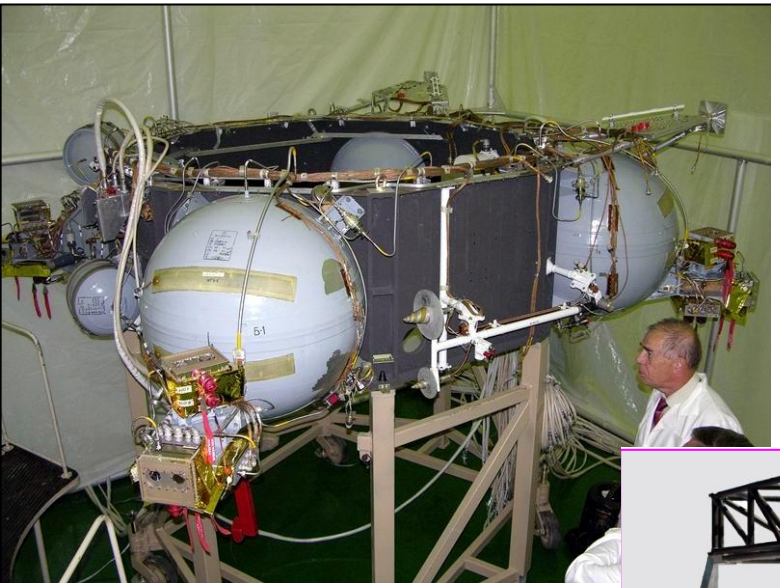
PLATFORM: Navigator

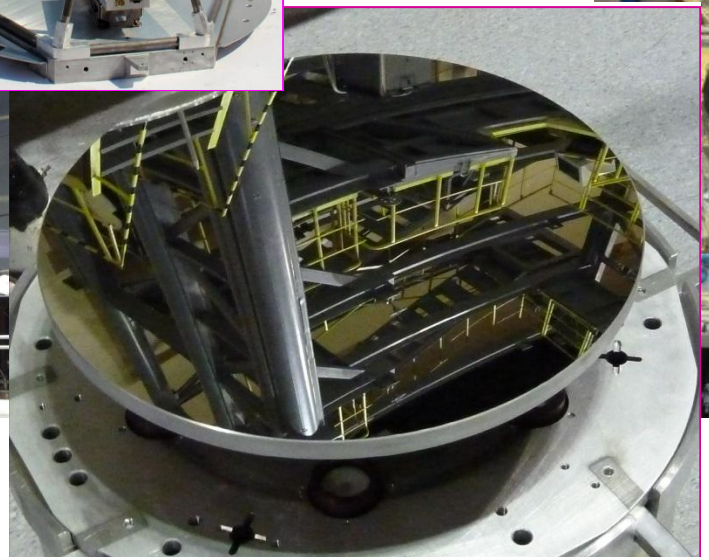
ORBIT: geosynchronous, i =51.6deg

LAUNCHER: ZENITH 2SB

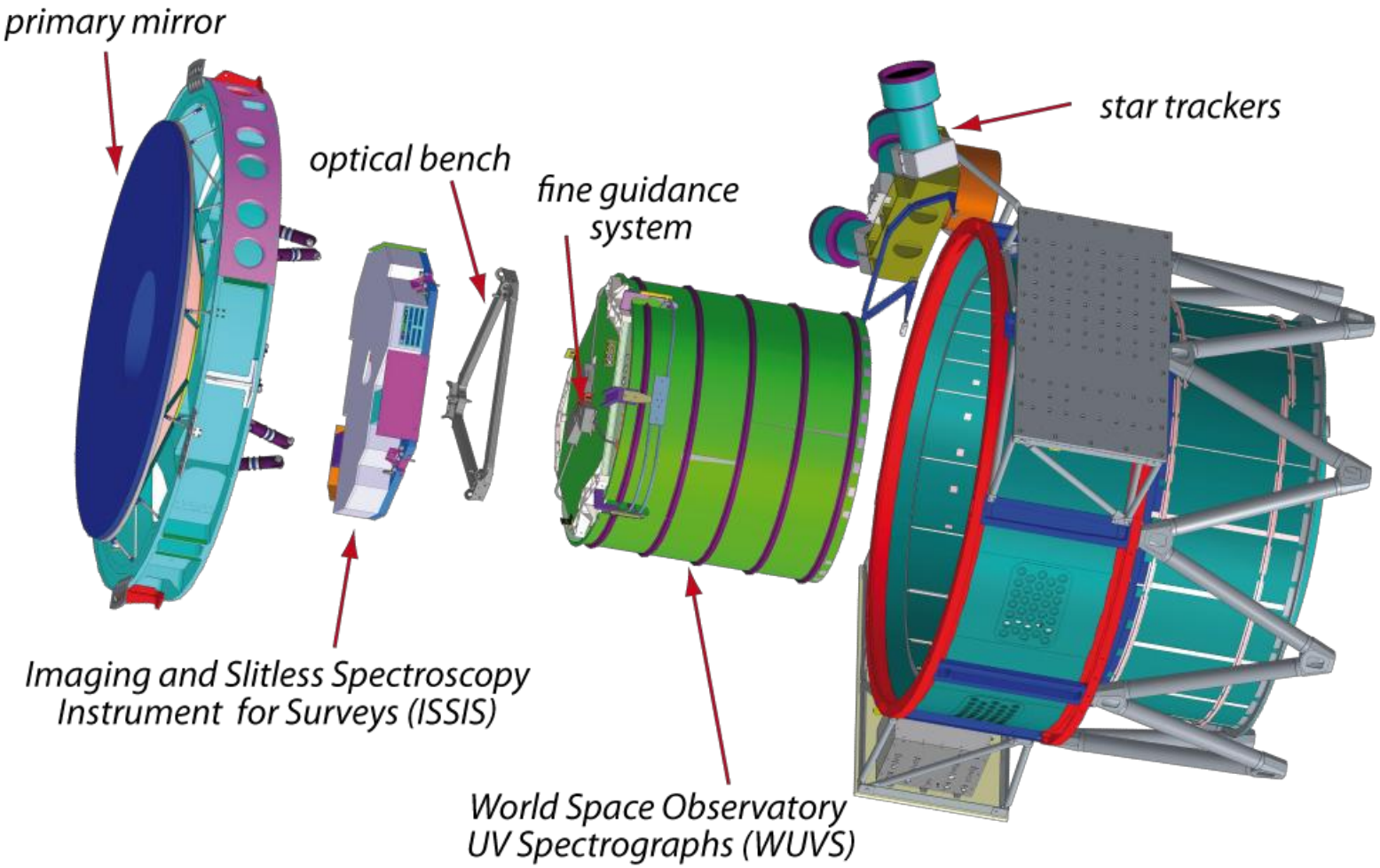
GROUND SEGMENT







T170M instrument compartment



WUVS (WSO-UV Spectrograph)

Three channels/spectrographs:

- Vaccum UV Echelle Spectrograph (VUVS)

115-176nm, R=50,000

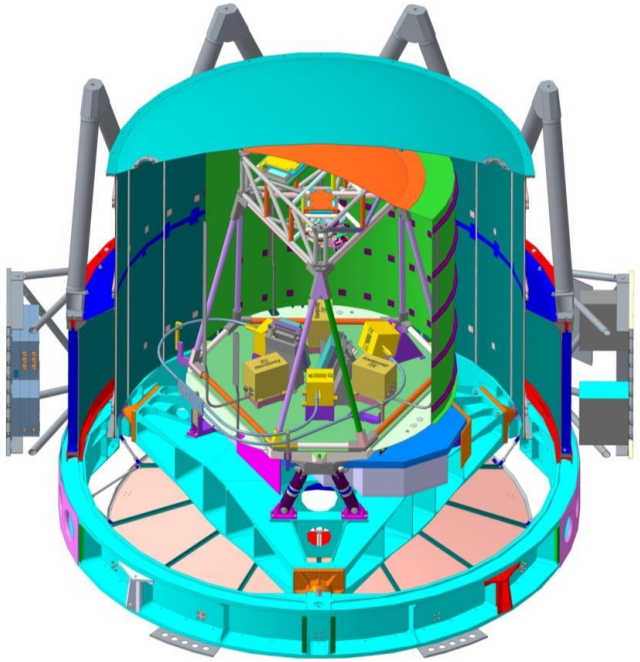
- UV Echelle Spectrograph (UVS)

176-310nm, R=50,000

- Long Slit Spectrograph (LSS)

115-310nm, R=1,000, θ=0.5arcsec

Detectors: e2v CCDs



IMAGING AND SLITLESS SPECTROSCOPY INSTRUMENT (ISSIS)

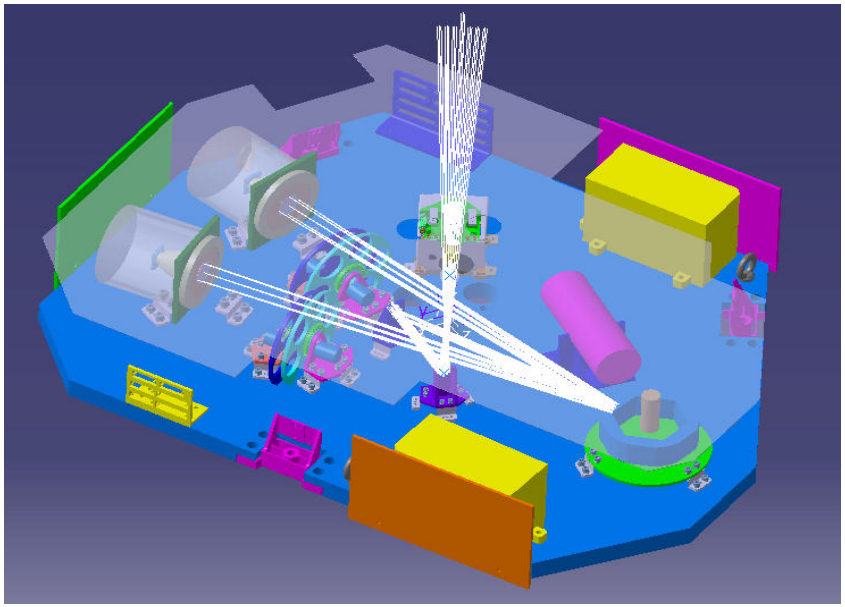
Two channels for imaging/spectroscopy:

- Near UV Channel (NUV)

115-176nm, R=500

- Far UV Channel (FUV)

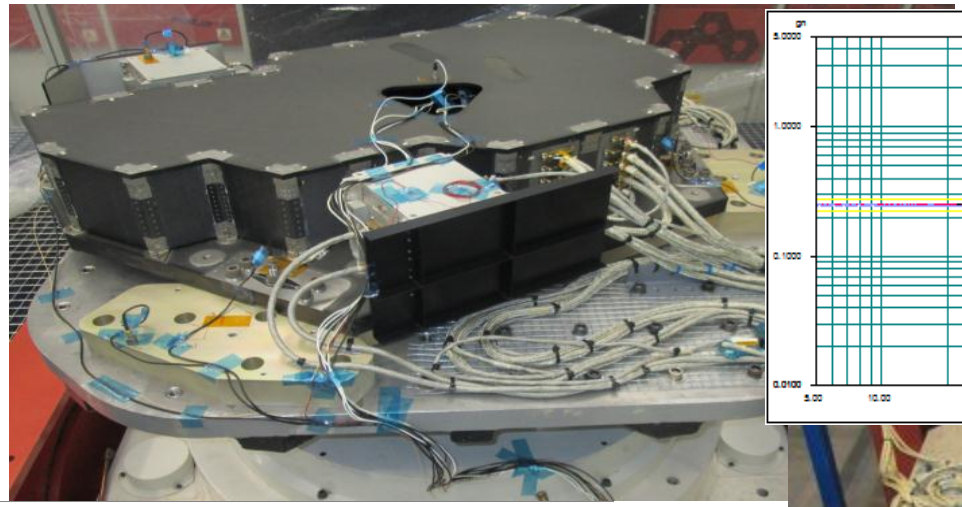
185-320nm, R=500

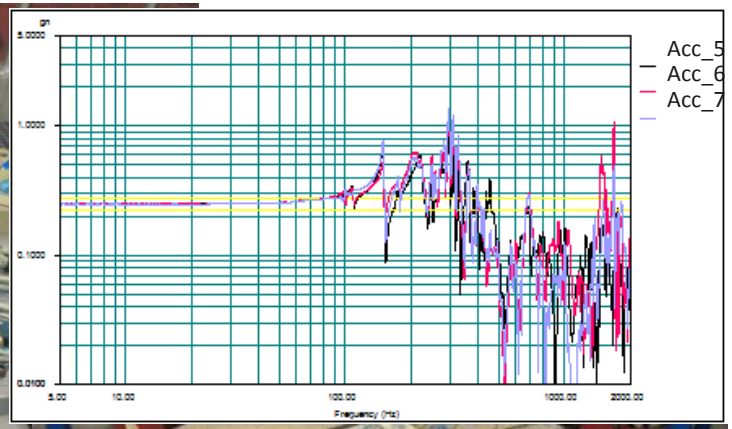


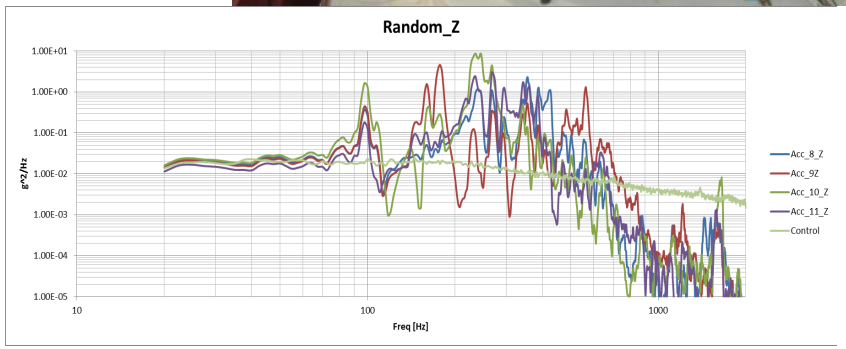
Spatial resolution < 0.1arcsec
Field of View: 1.2 arcmin

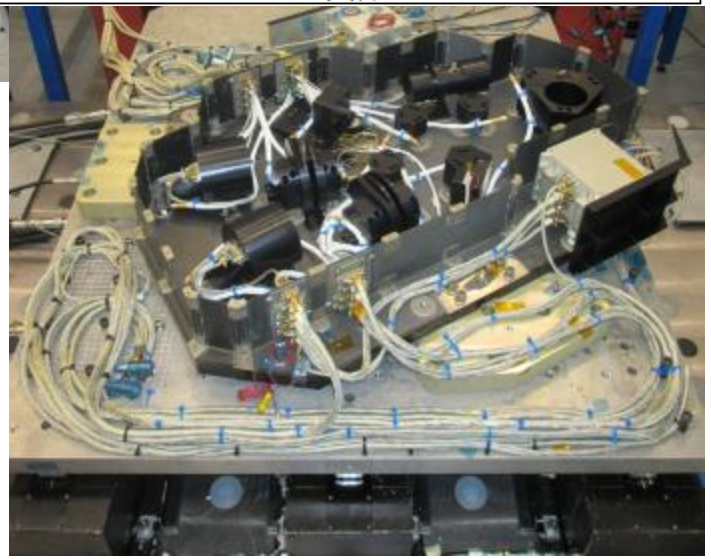
Detectors: MCP – UVIT baseline

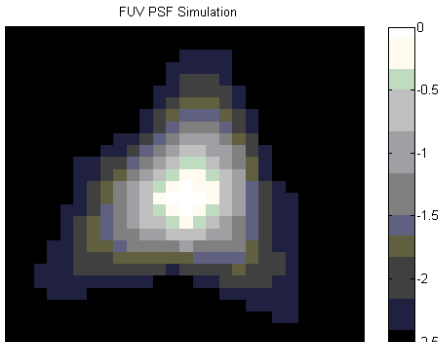
ISSIS STM – TESTS @ CTA-VITORIA







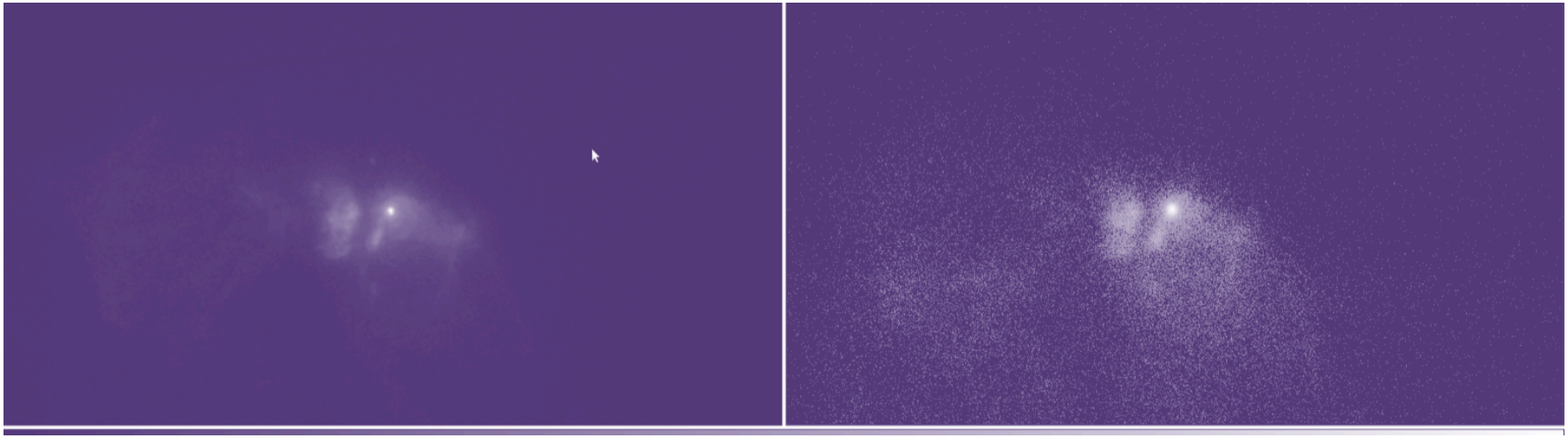




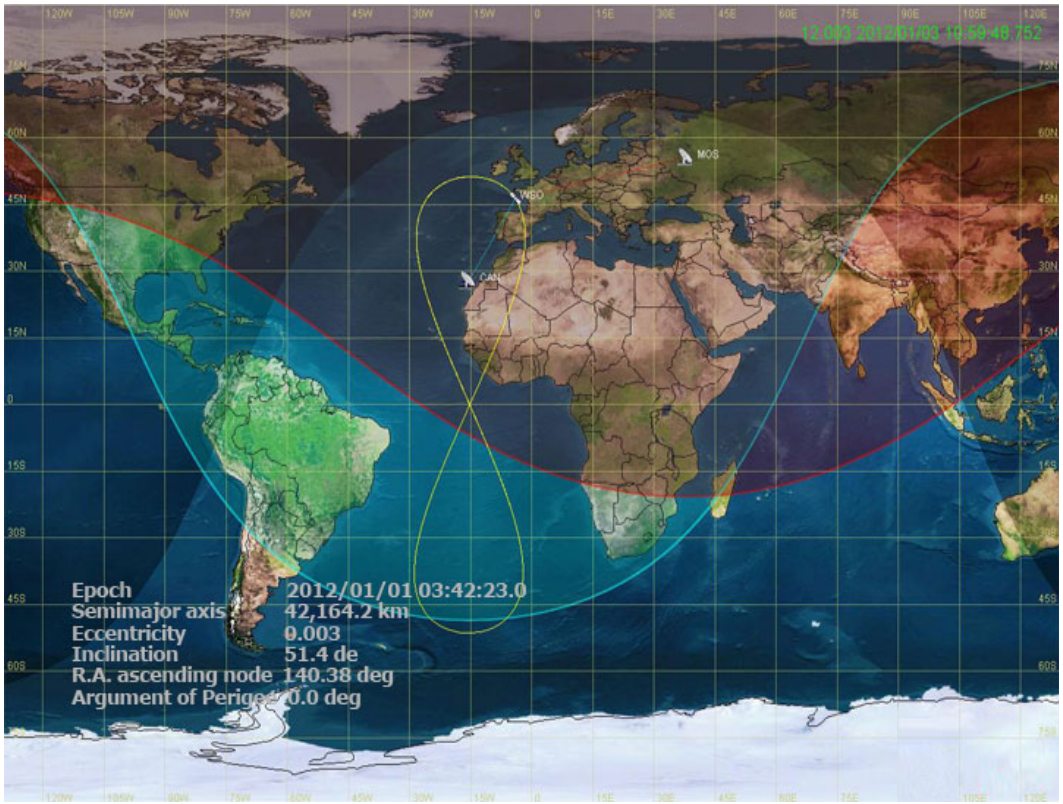
ISSIS Simulator in ACCUM mode

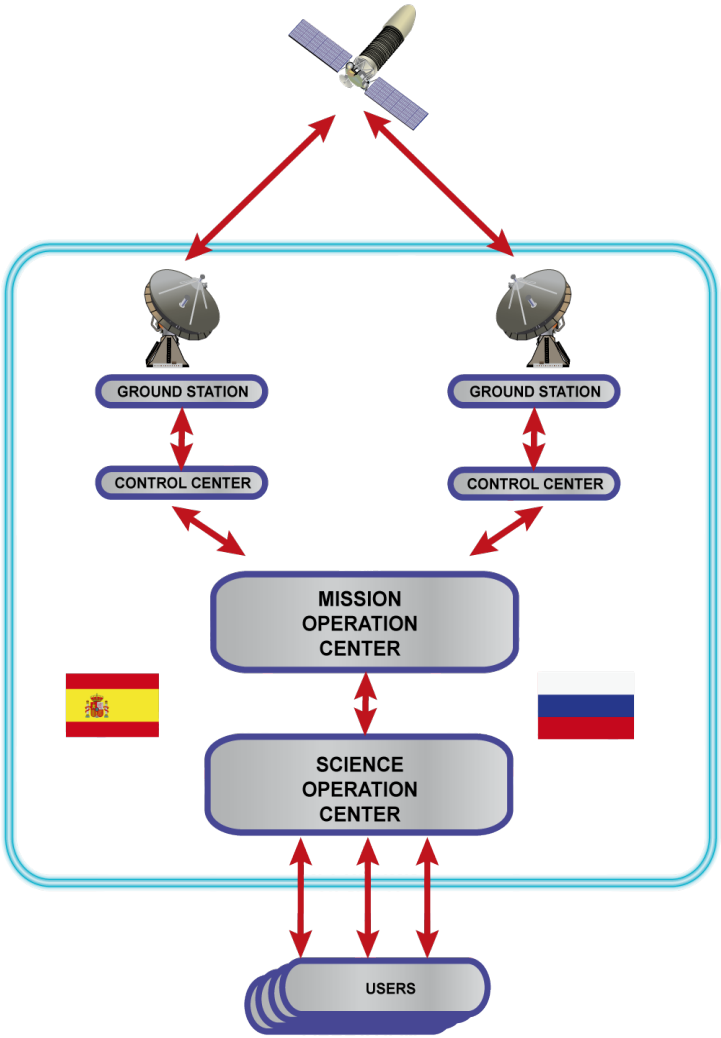
HST Image of T Tau H2 band – ACS/SBC

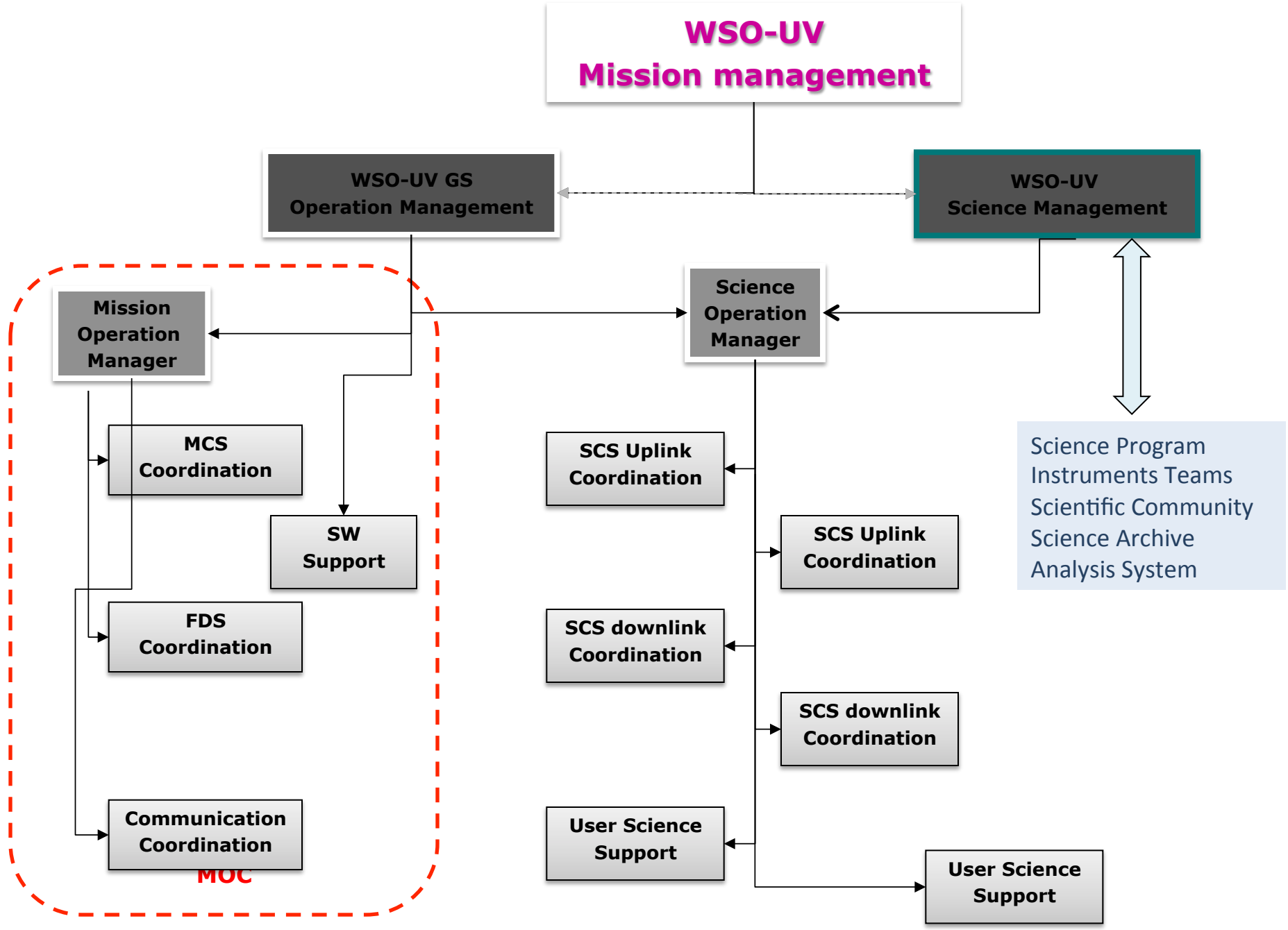
ISSIS SIM Image of T Tau H2 band



WSO-UV MISSION CONCEPT

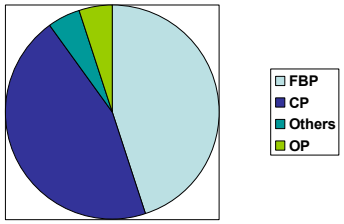





WSO-UV
Mission management
WSO-UV GS
Operation Management
WSO-UV
Science Management
Mission
Operation
Manager
Science
Operation
Manager
MCS
Coordination
SW
Support
FDS
Coordination
Communication
Coordination
MOC
SCS Uplink
Coordination
SCS Uplink
Coordination
SCS downlink
Coordination
SCS downlink
Coordination
User Science
Support
User Science
Support
Science Program
Instruments Teams
Scientific Community
Science Archive
Analysis System

WSO-UV SCIENCE MANAGEMENT

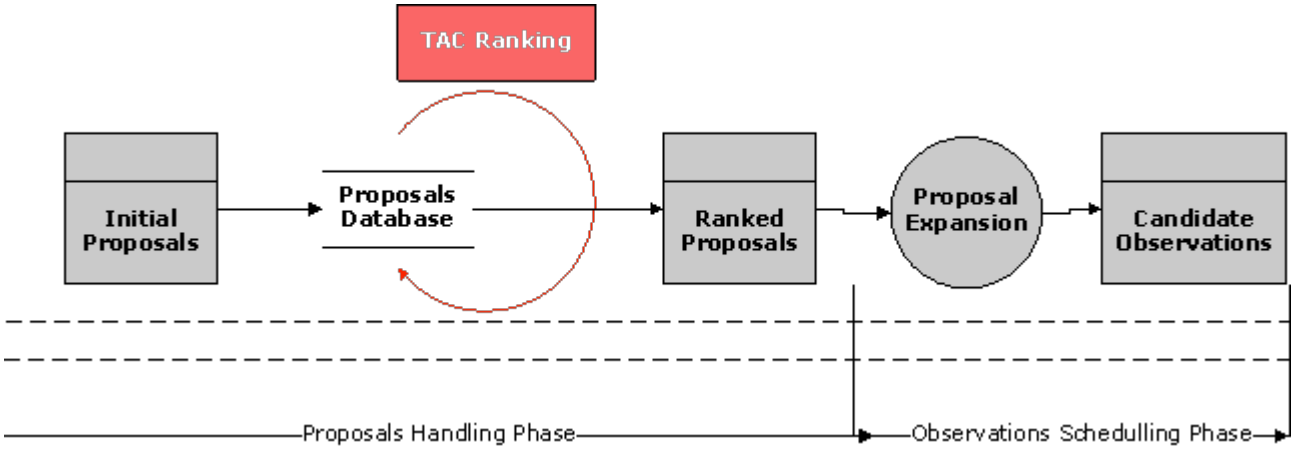
1st.year



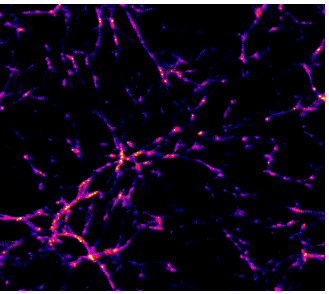
Core Program (CP): Fundamental science to be carried by the project team (ends in the first three years)

Funding Bodies Program (FBP): Guaranteed Time to the countries funding the project

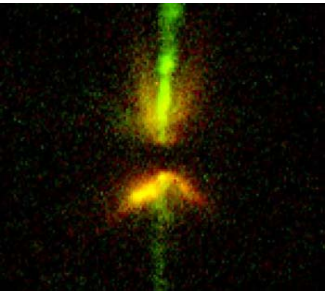
Open Program (OP): Open program to the world wide scientific community



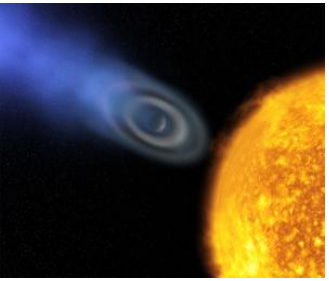
WSO-UV CORE PROGRAMME



Q1 WHICH is the distribution of diffuse baryonic matter in the Universe (up to z=2), its physical properties and its chemical composition/ enrichment?. Which role does it play in galaxy formation? Which is the baryonic mass fraction in the Universe hidden in voids in the intergalactic space?



Q2 HOW do gravitational plasma engines work? Which role does the interaction between the disk and the "source of gravity" play in driving the observed outflows? And, how do astrophysical disk evolve? when do they become passive? Which is the effect of the engine radiation on the mass repository evolution?



Q3 WHICH is the composition and properties of the atmospheres of extrasolar planets? and, How dependant is the chemistry on the initial planetary forming conditions?

WHAT AFTER?

The European proposal for a Large UV-Visible telescope presented to the last ESA call for Large missions

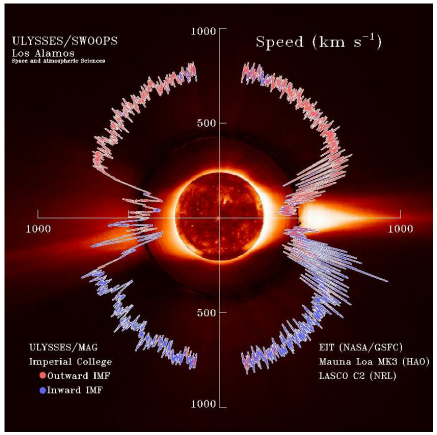
EUROPEAN ULTRAVIOLET-VISIBLE OBSERVATORY

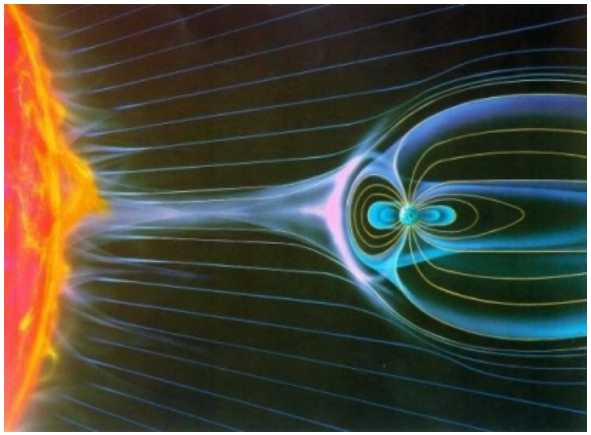
www.nuva.eu

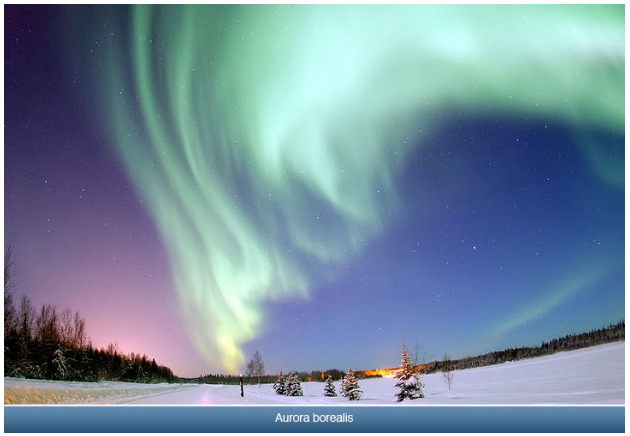
"Building galaxies, stars, planets and the ingredients for life between the stars"

THE EARTH CONNECTION

- **Earth's atmosphere is in constant interaction with the interplanetary medium and the solar UV radiation field**. Observation of planets, interplanetary medium, stellar magnetic activity provides the phenomenological baseline to understand the Earth atmosphere in context.







- A 50-100 times improvement in sensitivity would enable the observation of the key atmospheric ingredients of Earth-like exoplanets (carbon, oxygen, ozone), providing crucial inputs for models of biologically active worlds outside the solar system.

- Solar system planetary research is fundamental for **understanding atmospheres as global systems, including the Earth**.

THANK YOU

AEGORA – Space Astronomy Research Group @ Complutense Univ.

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