

Utilisation combinée de **CDPP**/AMDA et de l'OV astronomique

Multi-wavelength Spectroscopy and Imaging of Giant Planet Auroral Emissions as a Diagnostic of their Magnetospheric Activity

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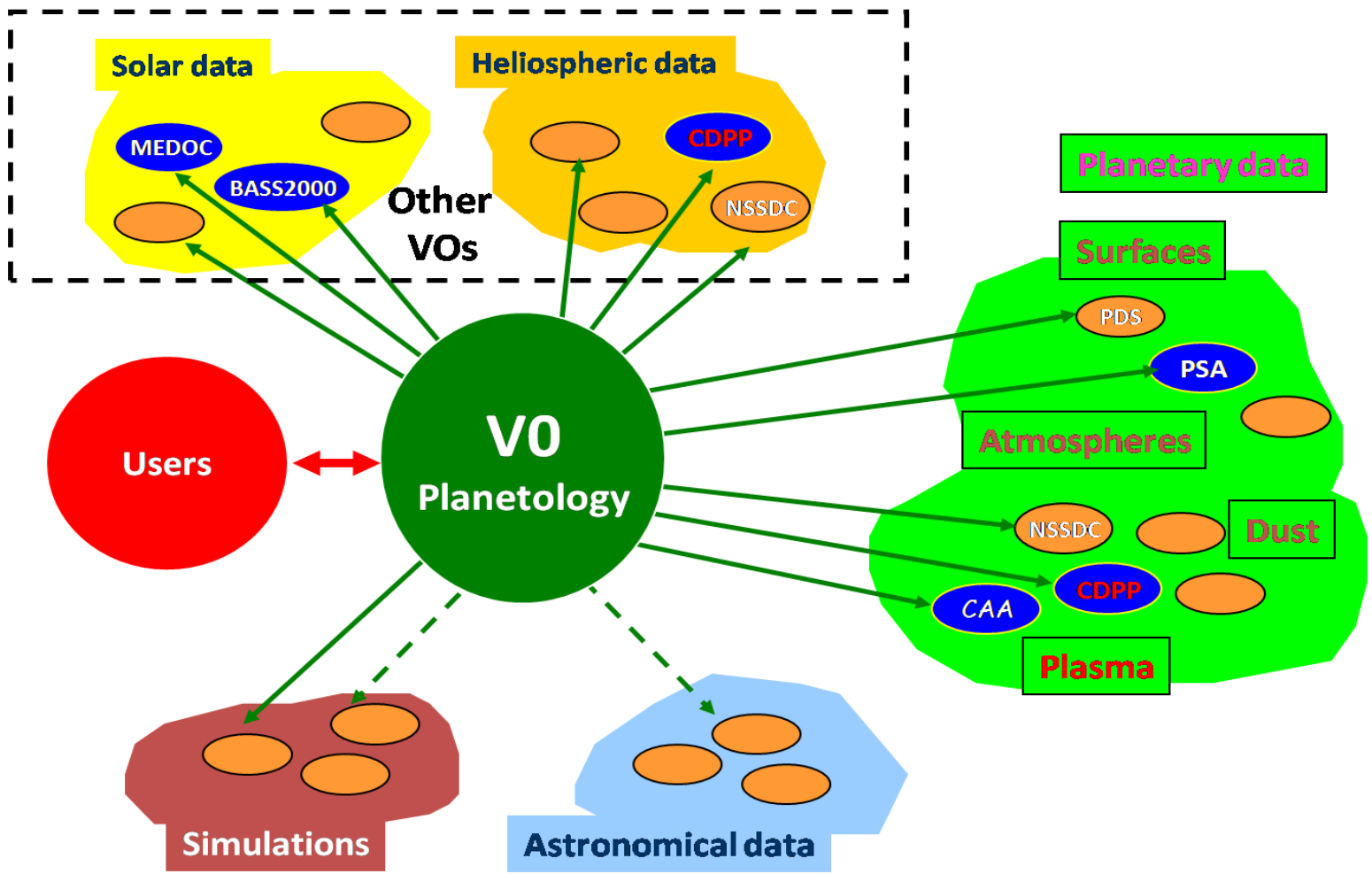
³NOVELTIS, 2 Avenue Europe, 31520 Ramonville Saint Agne, France

⁴Co-Libri, Cremefer 11290 Montréal, France

⁴Space Research Institute, Austrian Academy of Sciences, OAW, Graz, Austria

⁶CNES, Centre spatial de Toulouse, 18 avenue Edouard Belin, 31401 Toulouse, France

Towards a prototype of Virtual Observatory in Planetology?





Europlanet-RI IDIS (Integrated & Distributed Information System)

5 **thematic nodes** and 1 technical node

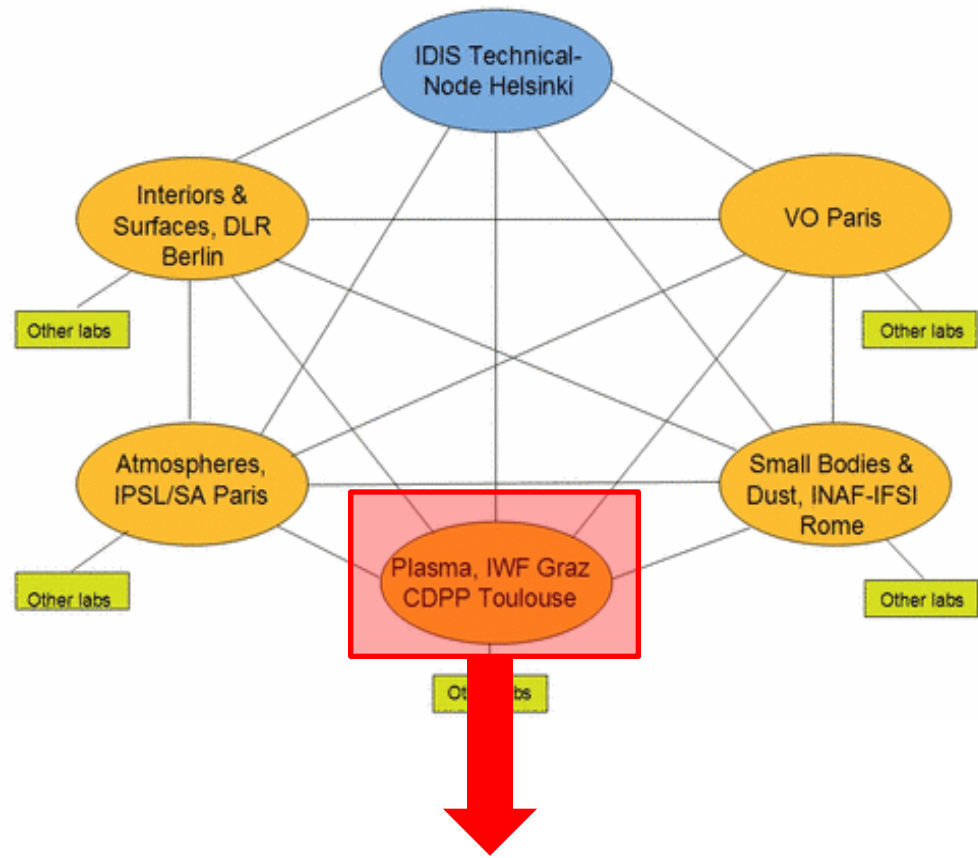
Its objective:

Develop Virtual Observatory tools

In order to access data from

- laboratory measurements
- ground+**spaced-based observations**
- modeling results

allowing comparative and pluri-disciplinary studies of planetary objects and environments



Plasma Node

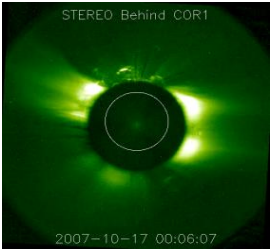
<http://europlanet-plasmanode.oeaw.ac.at/>



Science Case 3.1

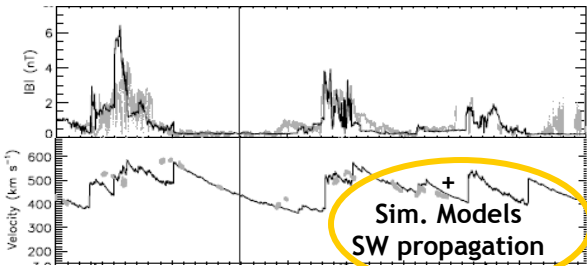
Solar wind interaction with Jupiter and Saturn aurorae

Plasma (multi-points)



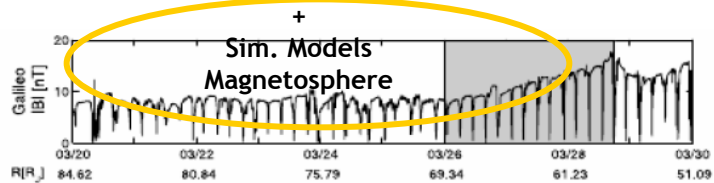
Solar data
SOHO LASCO
SOHO EIT

Heliospheric data



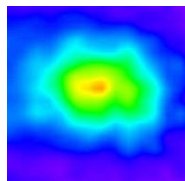
ACE MAG/SWEPAM, ULYSSES MAG/SWOOPS

Cassini MAG/CAPS/MIMI, Galileo MAG/PLS/EPD

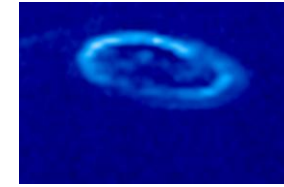
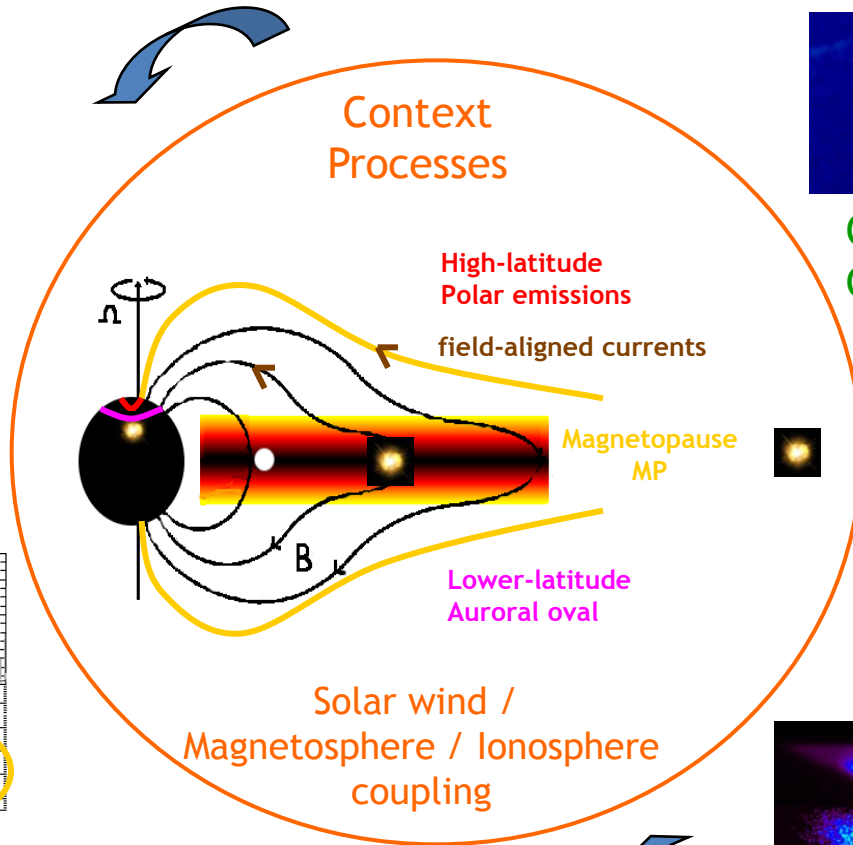


Planetoplasma data

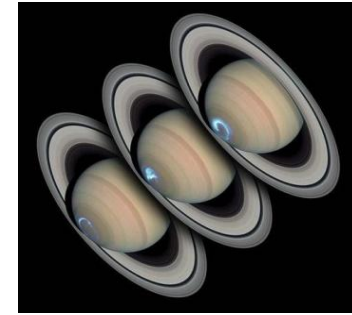
Cassini INCA



Context Processes

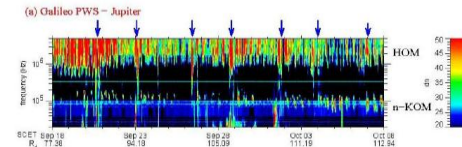


Cassini UVIS
Galileo UVS



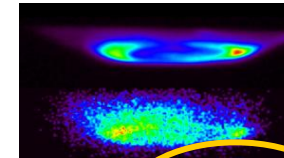
HST (STIS), IUE

Atmosphere (multi-λ)



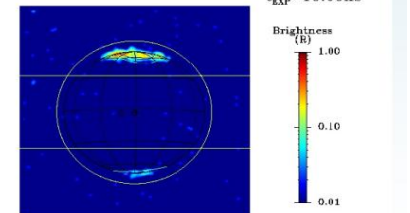
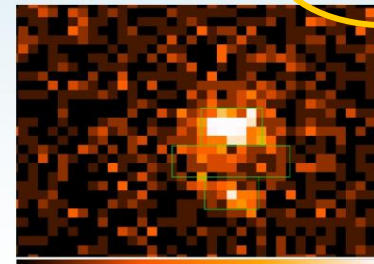
Cassini RPWS
Galileo PWS

IRTF



XMM EPIC
Chandra ACIS

XMM-Newton
0.2 - 2.0 keV
Ref. Models Spectroscopy



CML ~ 60° - 290°

Plasma
(multi-points)

Solar data

<http://sohowww.nascom.nasa.gov/data>

SOHO LASCO, SOHO EIT

<http://bass2000.bagn.obs-mip.fr/>

Heliospheric data

<http://vho.nasa.gov/>

<http://ccmc.gsfc.nasa.gov>

<http://mapsview.engin.umich.edu/solarwind>

<http://helio.estec.esa.nl/ulysses/archive/>

Magnetospheric data

ACE MAG/SWEPAM , ULYSSES MAG/SWOOPS

<http://cdaweb.gsfc.nasa.gov>

<http://cdpp.cesr.fr>

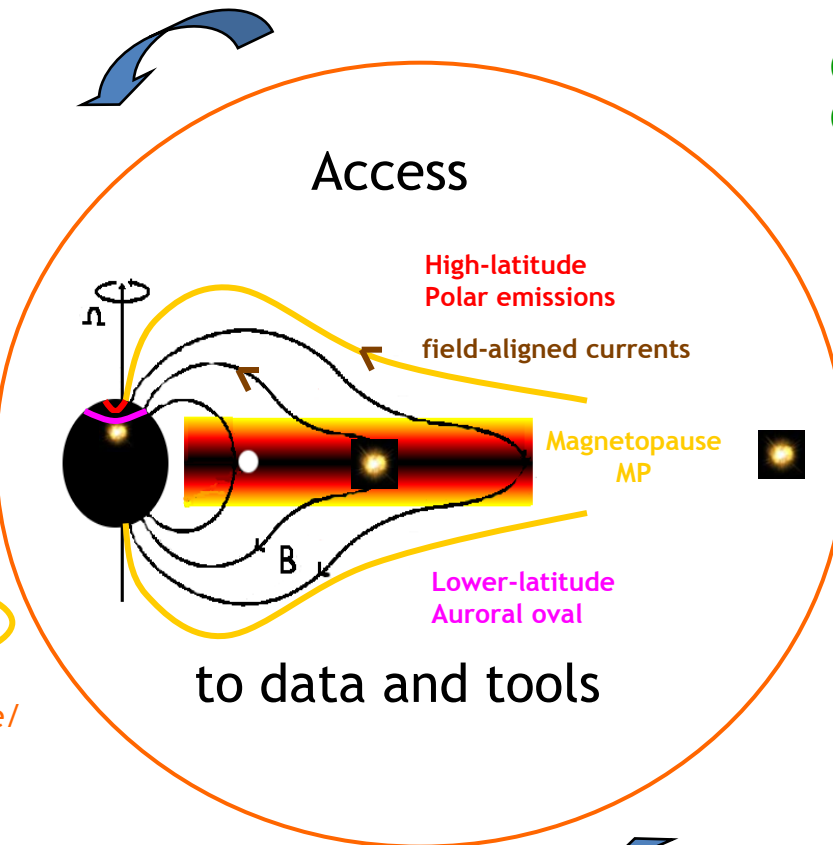
Cassini MAG/CAPS/MIMI, Galileo MAG/PLS/EPD

<http://pds-ppi.igpp.ucla.edu>

Planetoplasma data

<http://www.rssd.esa.int/PSA>

SPICE kernels



Cassini UVIS
Galileo UVS

<http://pds-atmospheres.nmsu.edu>

HST (STIS), IUE

<http://archive.stsci.edu/hst>

<http://cdsweb.u-strasbg.fr>

Atmosphere
(multi- λ)

IRTF, Keck

<http://irtfweb.ifa.hawaii.edu>

Cassini RPWS
Galileo PWS

<http://pds-ppi.igpp.ucla.edu>

www.planetary.brown.edu/pds

XMM EPIC
Chandra ACIS

<http://xmm.esac.esa.int/xsa>

<http://cxc.harvard.edu/cda>

Magnetospheric models
Uni. Michigan

Cassini INCA

<http://pds-ppi.igpp.ucla.edu>

Plasma (multi-points)

Solar data

Time series, images
movies
Public ...

SOHO LASCO
SOHO EIT

Heliospheric data

Time series, ascii, cdf
Public ...

Heliospheric models
Restricted and public

Magnetospheric data

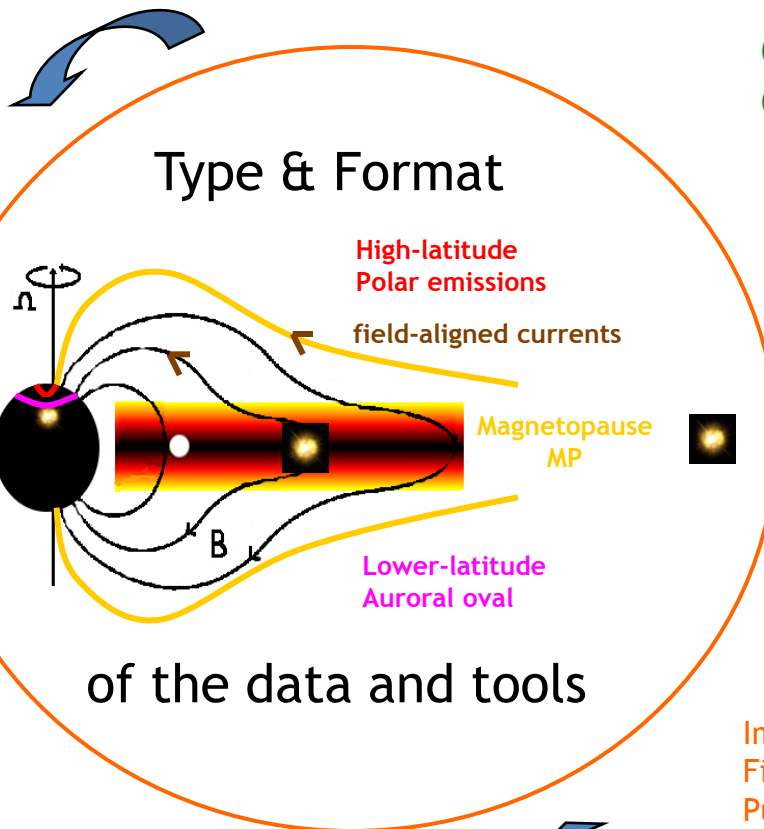
ACE MAG/SWEPAM , ULYSSES MAG/SWOOPS

Time series, ascii, binary ...
Public ...

Planetoplasma data

Time series, ascii, binary, PDS format
Public ...

Magnetospheric models
Restricted



Type & Format

of the data and tools

Cassini UVIS
Galileo UVS

Images, spectra, projection
Public ...

HST (STIS), IUE

Images, spectra, projection
Fits
Public (after 1 year)

Atmosphere
(multi- λ)

IRTF, Keck

Images, spectra, projection
Fits
Public ...

Cassini RPWS
Galileo PWS

Time series, projection (goniopolarimetry)
Public ...

Cassini INCA

Time series, images
movies
Public ...

Ref. models: spectroscopy
Restricted and public

XMM EPIC
Chandra ACIS

Images, spectra, projection
Fits
Public (after 1 year)



Plasma Data

The CDPP/AMDA Service



CDPP, the french Plasma Physics Data Center (CNRS/CNES)

Hosted at CESR, Toulouse, France

<http://cdpp.cesr.fr>

Its Missions:

- 1) Data Archive (long-term preservation)
- 2) Data Valorization
 - Making data easy to use
 - Providing **tools** and **services**
- 3) Participation to **Virtual Observatories**





AMDA (Automated Multi-Dataset Analysis) Functionalities

Web-based facility for online analysis of space physics data

<http://cdpp-amda.cesr.fr>

Evolving in the VO paradigm

Automated access to data

⇒ the user plays with **parameters**, not with data files

Produces and exploits **time-tables**

Its **7 functionalities** allow to use and couple these two objects

1. Visualization editor

2. Download data

3. Parameter editor

4. External data

5. Visual search

6. Conditional search

7. Time-Table manager



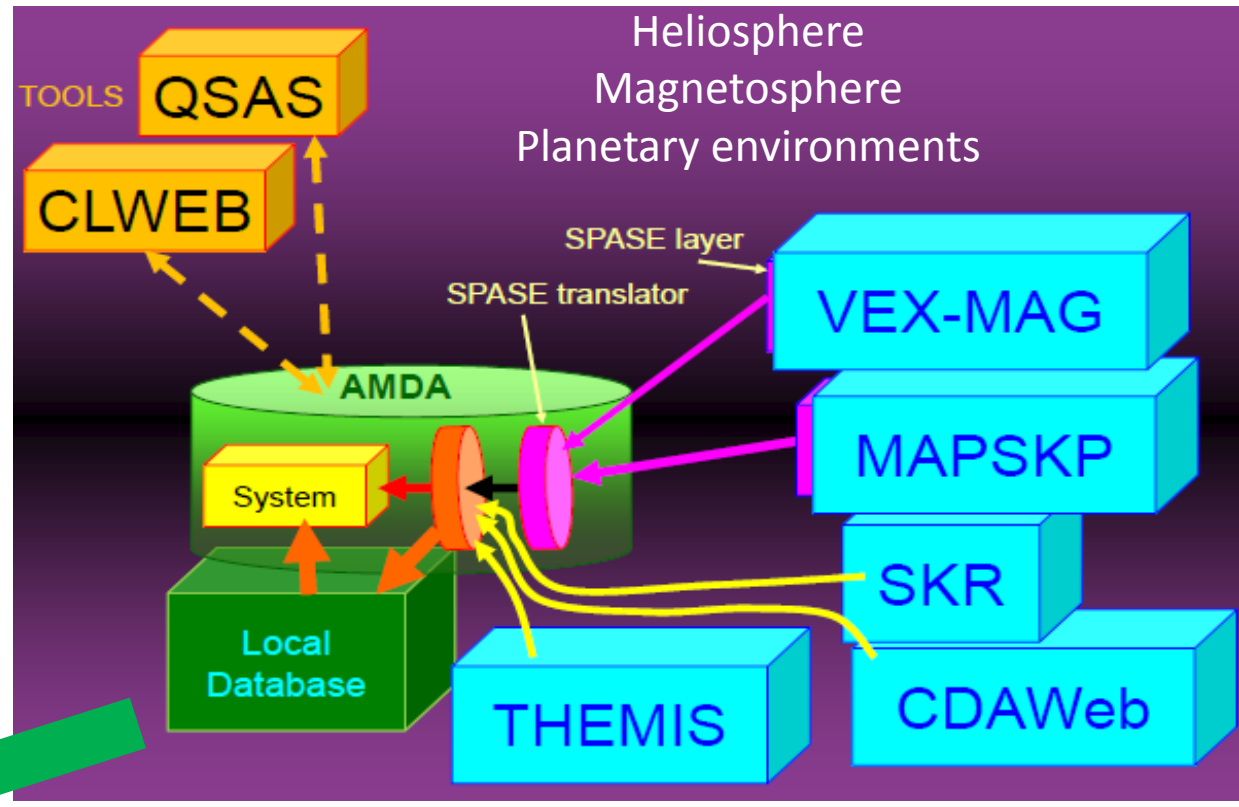
CDPP/AMDA Local and Remote Data Access

Interoperability

Perspectives
ICES, UK

CESR, France

Cluster
Interball
Geotail
...



CESR, France
Mirror site

IWF, Austria

CESR, France
Mirror site

LESIA, France

GSFC, USA



AMDA Functionality #1: Visualization Editor

Welcome to AMDA - Mozilla Firefox

http://manunja/~budnik/AMDANEW/DDHTML/HTML/loginreq.php

Help Feedback Logout

My Parameters My Time Tables **Plot Data** Download Data Search in Data External Data

Select parameters to plot

Add to Request Reset

- close all open all
- AMDA
 - CASSINI
 - VEX
 - ephemeris
 - orbit
 - xyz_vso
 - IMA
 - imaextra_spectra_prelim
 - protons
 - heavy_ions
 - imaextra_nom_prelim
 - ELS
 - elsspec
 - spectra
 - MEX
 - THEMIS-A
 - THEMIS-B
 - THEMIS-C
 - THEMIS-D
 - THEMIS-E
 - CLUSTER1
 - CLUSTER2

	Parameter Name	Plot Region				X Data Range		Y Data Range	
		XPmin	YPmin	XPmax	YPmax	Xmin	Xmax	Ymin	Ymax
0	xyz_vex(0:2)	0	0.1	0.9	0.21	0	0	0	0
1	vex_h_spec	0	0.21	0.9	0.32	0	0	0	0
2	vex_o_spec	0	0.32	0.9	0.43	0	0	0	0
3	vex_els_spec	0	0.43	0.9	0.54	0	0	0	0
4	VEXGRAZMAG_VSO	0	0.54	0.9	0.65	0	0	0	0
5	VEXGRAZMAG_VSO	0	0.65	0.9	0.76	0	0	0	0
6	WVS_bm_venus	0	0.76	0.9	0.87	0	0	0	0
7	WVS_ration_bx_bm_ve	0	0.87	0.9	0.98	0	0	0	0

Start Time: Year / Mon / Day Hour : Min : Sec
2006 / 09 / 10 00 : 00 : 00

Time Interval: Day / Hour : Min : Sec
002 / 00 : 00 : 00

Reset

Plot PNG Plot PostScript Save Request To request

Plot PNG for My Times SearchTable Plot PNG for Standard Times

Parameter Selection

Plot Composer

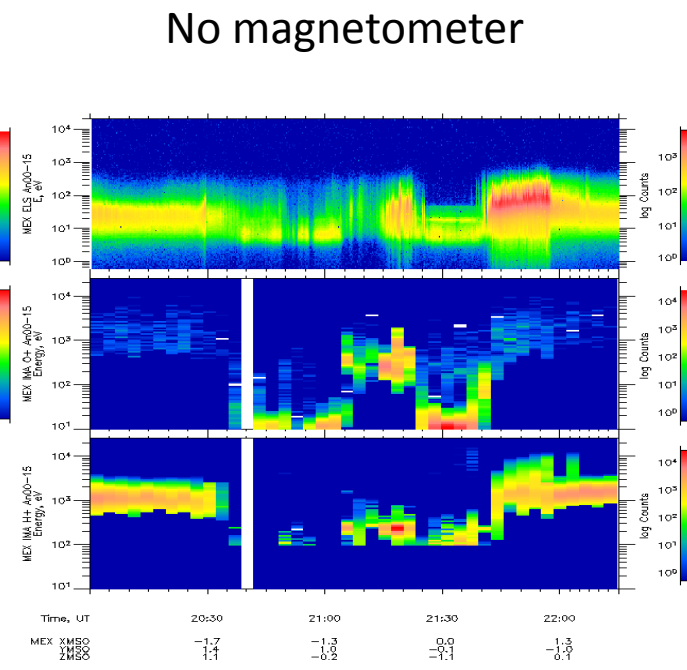
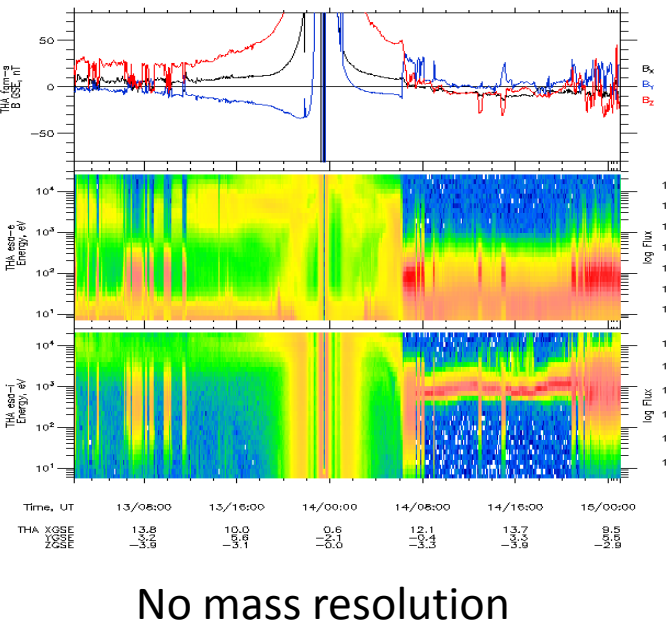
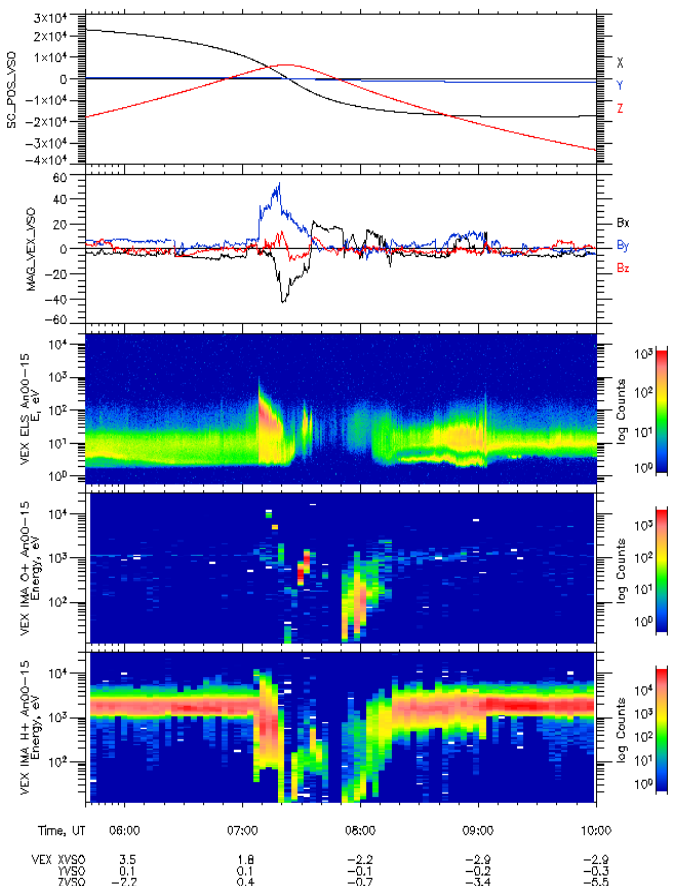


AMDA Functionality #1: Visualization Editor

Venus (VEX)

Earth (THEMIS)

Mars (MEX)



No mass resolution



AMDA Functionality #3: Parameter Editor

Welcome to AMDA - Mozilla Firefox

Fichier Édition Affichage Historique Marque-pages Outils ?

http://manunja.cesr.fr/~budnik/AMDANEW/DDHTML/HTML/loginreq.php

Help Feedback Logout

My Parameters My Time Tables Plot Data Download Data Search in Data External Data

Select parameters to construct new Workspace parameter

- close all open all
- AMDA
- VEXGRAZ
- CDAWEB
- MAPSKP
 - Cassini
 - TRAJ
 - MAG
 - MAG_KSM
 - VECTOR
 - Bx
 - By
 - Bz
 - MAGNITUDE
 - RPWS
 - MIMI

My Workspace

PARAMETERS

- bm_venus
- ration_bx_bm_venus
- radius_venus

Construct Parameter

deriv_(smooth_(sqrt(MAPSKP:MAG_KSM

HOWTO

Bricks for construction :

- AMDA parameters from left-frame tree or your aliases
- Operators: +, -, *, /, ^ and brackets: () , []
- Constants, IDL and AMDA functions

Example:
sin(param1)^2+sqrt(abs(param2))*5

Constants IDL Functions **AMDA Functions**

mean_(,)	smooth_(,)	vari_(,)
kurt_(,)	skew_(,)	shiftN_(,)
shiftT_(,)	deriv_0	gsegsM_0
gsegsM_0		

My Parameter Name	Time Step (secs)	Units (optional)	My Parameter
deriv_b_cas	60	none	Time-derivative Bm

Save My Parameter Reset

Define an Alias for AMDA Parameter (optional)

AMDA Parameter	My Alias

Save Alias

http://manunja.cesr.fr/~budnik/AMDANEW/DDHTML/HTML/operations.php#a

$$\chi_B = \left(\frac{\frac{d}{dt} B}{B} \right)^2$$



Illustration: MP Detection at Saturn

Masters, Kanani, McAndrews (MAPSview)

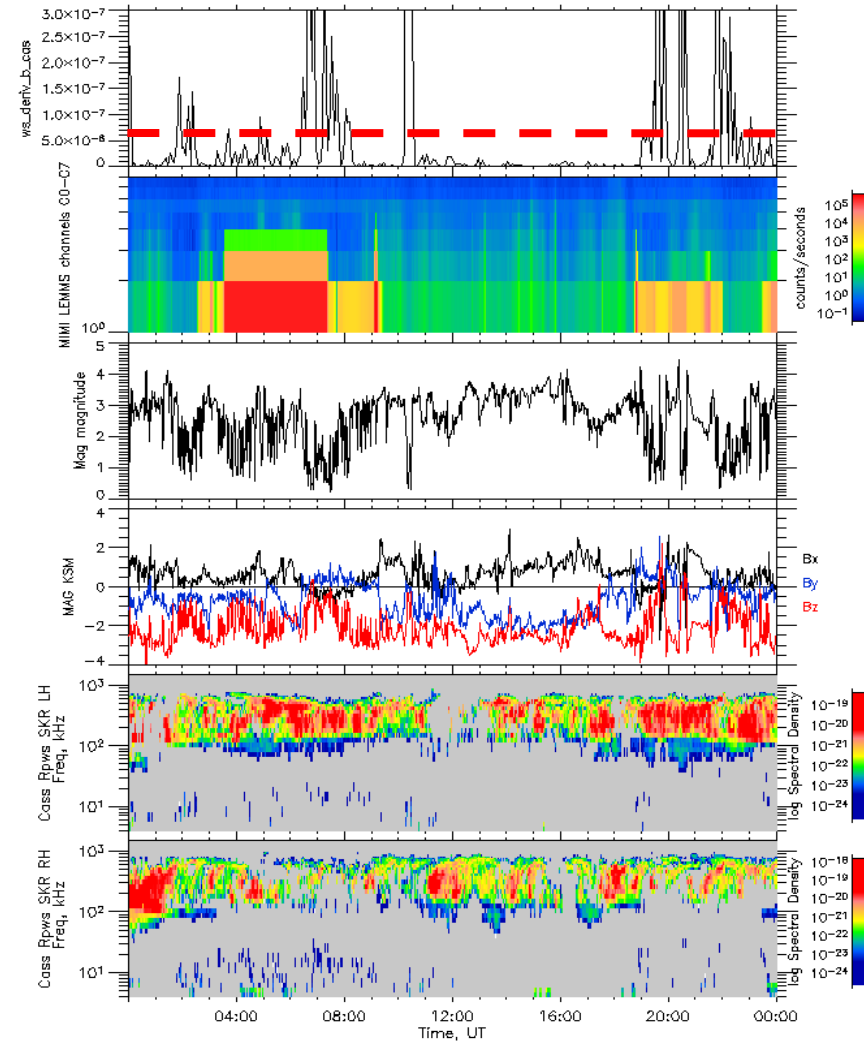
Building parameters:

$$\chi_B = \left(\frac{\frac{d}{dt} \langle B \rangle_{60}}{\langle B \rangle_{60}} \right)^2$$

Conditional search:

$$\chi_B > 5.10^{-8}$$

- 2007 175 0 10
- 2007 175 1 30
- 2007 175 2 40
- 2007 175 3 0
- 2007 175 4 45
- 2007 175 5 0
- 2007 175 5 40
- 2007 175 6 25
- 2007 175 9 20
- 2007 175 10 15
- 2007 175 10 30
- 2007 175 18 45
- 2007 175 19 50
- 2007 175 20 25
- 2007 175 20 45
- 2007 175 21 40
- 2007 175 23 0
- 2007 175 23 20
- 2007 175 23 40



Time Table of MP crossings



AMDA Functionality #6: Conditional Search

Mozilla Firefox

http://manunja.cesr.fr/~budnik/AMDANEW/DDHTML/USERS/nandre/TT/cs_crossing_vex.xml

Les plus visités Débuter avec Firefox À la une

Welcome to AMDA http://manunja...rossing_vex.xml

Time Table :

cs_crossing_vex

generated Tue May 12 15:08:46 2009

under conditions $\sqrt{xyz_vex(0)^2+xyz_vex(1)^2+xyz_vex(2)^2}<3$ & $\sqrt{xyz_vex(0)^2+xyz_vex(1)^2+xyz_vex(2)^2}>1.5$ & $VEXGRAZ_MAG_VSO_SC_POS_VSO(0)<0$ & $abs(VEXGRAZ_MAG_VSO_SC_POS_VSO(1))/abs(VEXGRAZ_MAG_VSO_SC_POS_VSO(0))<0.5$ & $VEXGRAZ_MAG_VSO_MAG_VEX_VSO(0)*shiftT_ (VEXGRAZ_MAG_VSO_MAG_VEX_VSO(0),60)<0$

AMDA Search: Time_Step: 600.0s; Data_absence_is_gap_for_gaps > 5 Data_Sampling_Times; Start_Time:2006-12-15T00:00:00 Time_Interval:015d00h00m

StartTime	StopTime
2006-12-17T08:00:00	2006-12-17T08:10:00
2006-12-17T08:20:00	2006-12-17T08:30:00
2006-12-19T08:10:00	2006-12-19T08:40:00

Time Table cs_crossing_vex created

Terminé

démarrer Oral_Andre [Mode de... themis_amda [Mode ... Mozilla Firefox 15:29



AMDA Functionality #7: Time-Table Manager

Welcome to AMDA - Mozilla Firefox

http://manunja.cesr.fr/~budnik/AMDANEW/DDHTML/HTML/loginreq.php

Help Feedback Logout

My Parameters My Time Tables Plot Data Download Data Search in Data External Data

My Workspace

TIME TABLES

- nicolas_venus
- SearchTable
- test
- cs_crossing_vex

Operations

Union Intersection

Download

Time format: YYYY-MM-DDThh:mm:ss File format: plain text

Compression: targz zip Download

Upload

Time format: YYYY-MM-DDThh:mm:ss File format: plain text

From local machine: Parcourir...

From url:

Construct/Modify the Time Table

Table Name: cs_crossing_vex

Date of Generation: Tue May 12 15:08:46 2009

Description: $\sqrt{xyz_vex(0)^2+xyz_vex(1)^2+xyz_vex(2)^2}$ &

Source: AMDA Search: Time_Step: 600.0s; Data_absence_is_gap_for_gaps > 5 Data_Sampling_Times; Start_Time:2006-12-15T00:00:00 Time_Interval:015d00h00m

Number of Intervals: 3

Extend Intervals (min): 10

Shift Intervals (min): 0

Save to WS Reset

StartTime - StopTime

yyyy-mm-ddThh:mm:ss	yyyy-mm-ddThh:mm:ss	
2006-12-17T08:00:00	2006-12-17T08:10:00	-- 1
2006-12-17T08:20:00	2006-12-17T08:30:00	-- 2
2006-12-19T08:10:00	2006-12-19T08:40:00	-- 3

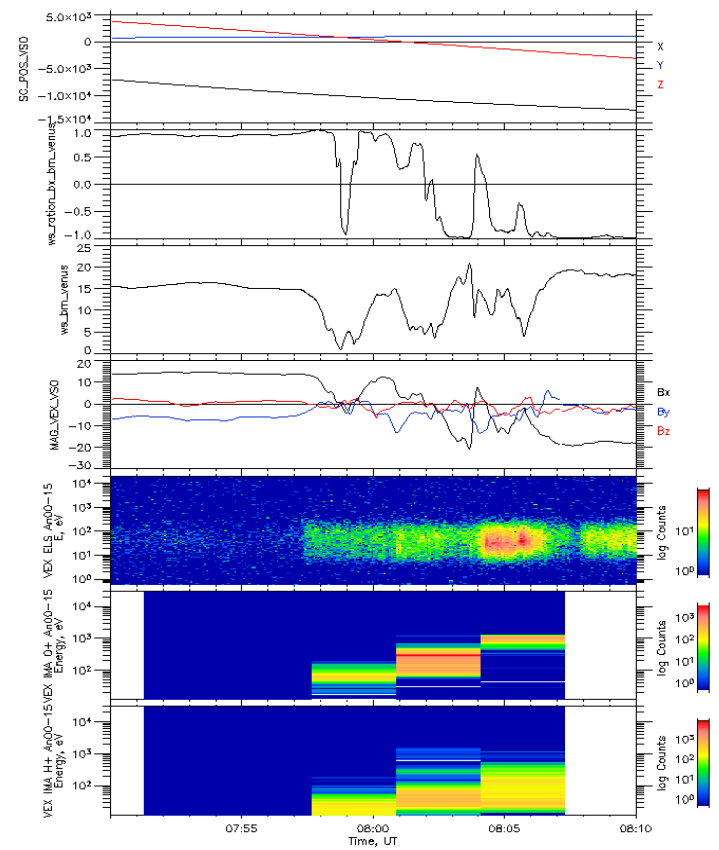
Terminé

démarrer Oral_Andre [Mode de... themis_amda [Mode de... Welcome to AMDA - ... 15:33

Illustration 2: Current Sheet Crossings

One of the 3 time intervals in the Time Table

Venus

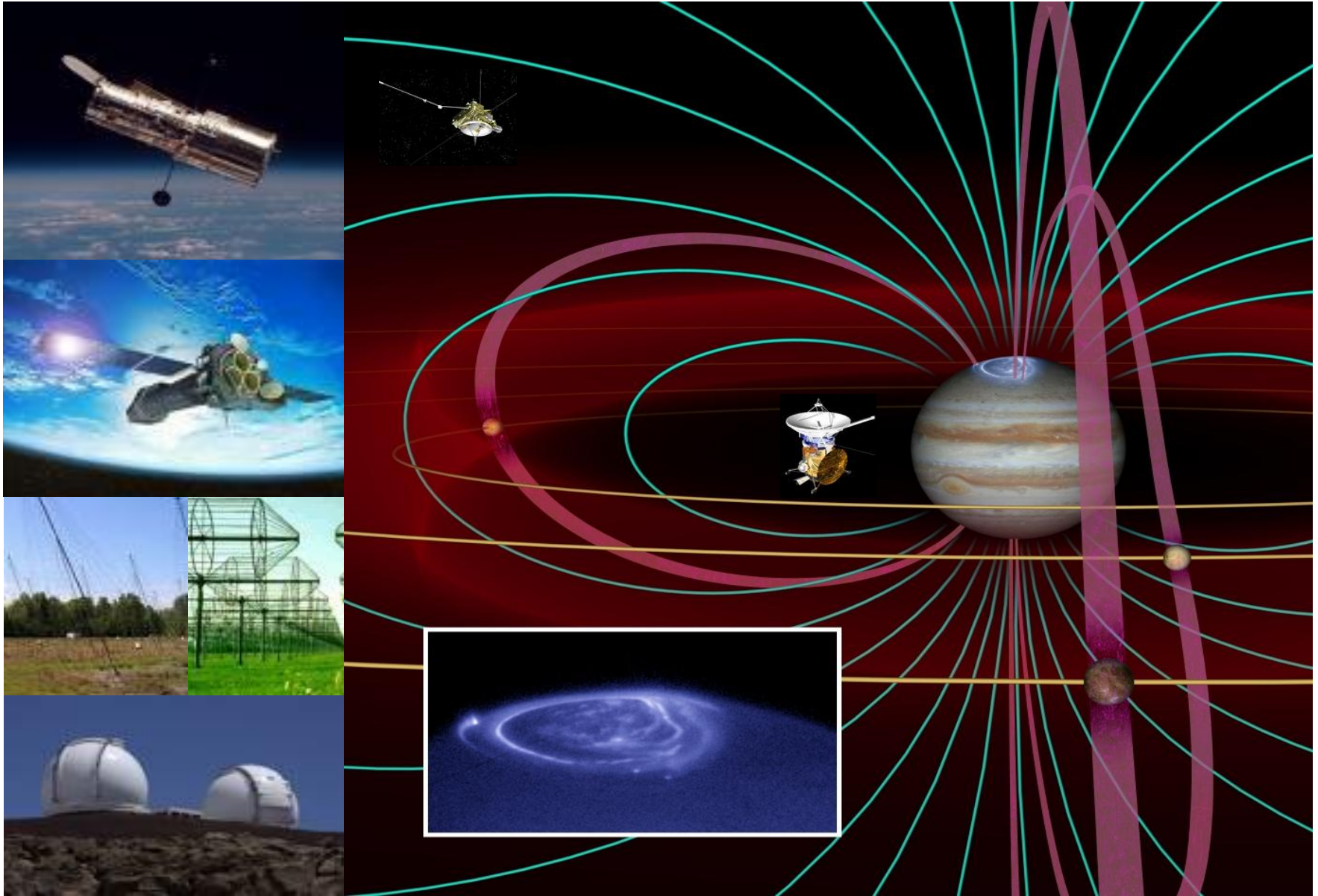


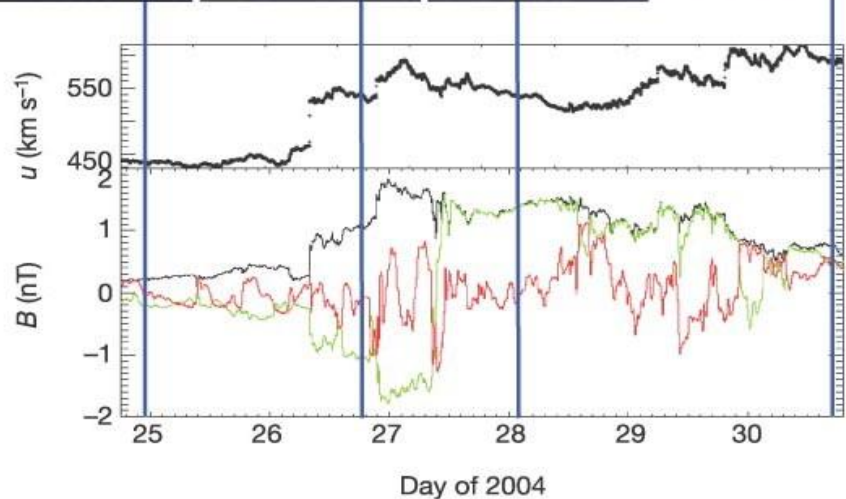
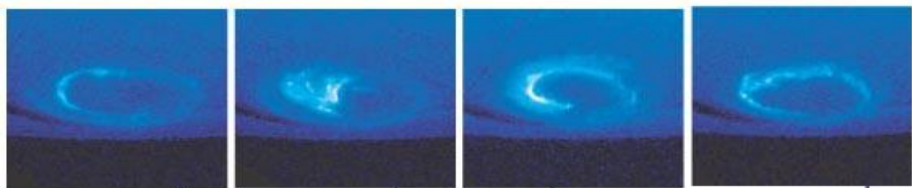


Multi-wavelength observations of giant planet auroral emissions

IVOA Tools

Spatial, temporal, multi-spectral information



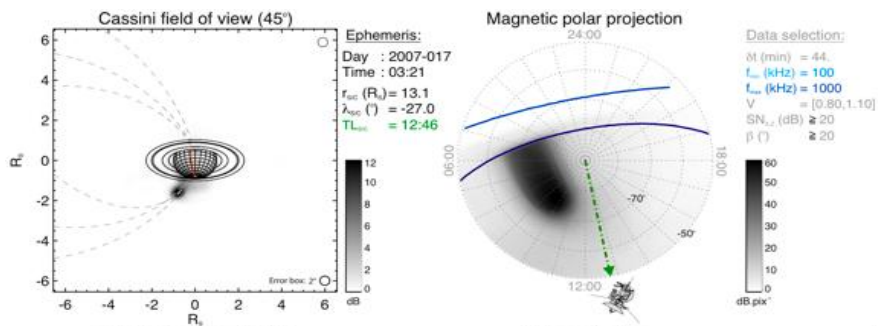
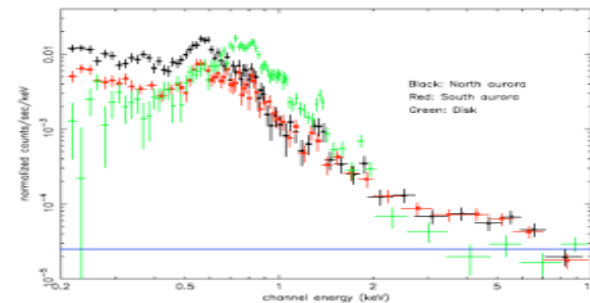


Temporal
(Aladin)

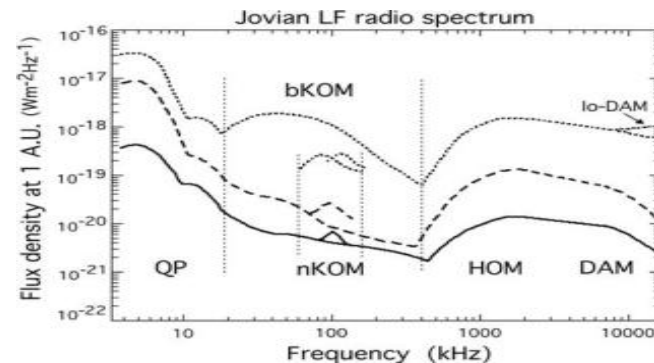
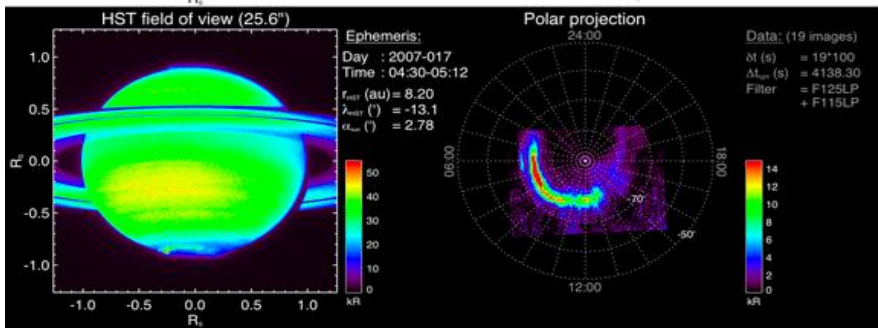
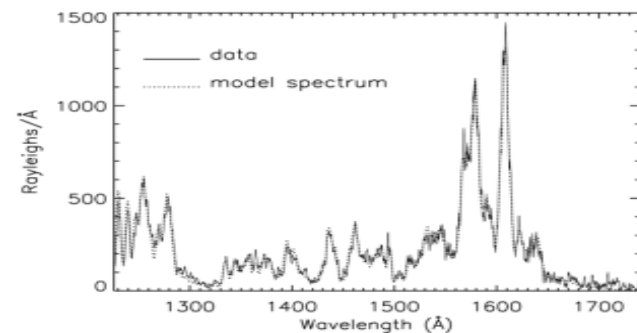
Targeted VO tools

- Data discovery
- Spectral analysis
- Data visualization

Multi-spectral
(VOSpec)



Spatial
(Topcat)





Case Study: Aladin

Illustration: Accessing the relevant HST observations (<1000)

The screenshot shows a Mozilla browser window titled "MAST HST Abstract Search - Mozilla" with the address bar containing "http://archive.stsci.edu/hst/abstract.html". The browser's menu bar includes File, Edit, View, Go, Bookmarks, Tools, Window, and Help. The navigation toolbar shows Back, Forward, Reload, Stop, and Search buttons. The website's navigation menu includes MAST, STScI, Tools, Mission_Search, Tutorial, and Site Search. A secondary menu below it lists HST Home, About HST, Getting Started, Registration, Archive Status, HST Search, HSTonline Search, and Suggestions.

The main content area is titled "HST ABSTRACT SEARCH" and contains the following text:
Search the HST proposal abstracts and/or proposal titles for specific strings of interest. You may also search the HST abstracts database for a specific Guest Investigator (either in combination with a string search of the abstracts or alone). You may enter lists of expressions separated by commas. See the [help](#) for more details.

The search form includes the following fields and options:
- "String to be searched for within the abstract:" with the input "aurora,+saturn" (circled in red).
- A checked checkbox for "Display Abstract?".
- "String to be searched for within the title:" with an empty input field.
- "Investigator first name:" and "and/or last name:" with empty input fields.
- "Proposal id or a list of ids separated by commas:" with an empty input field.
- "Cycle or a list of cycles separated by commas:" with an empty input field.
- "submit" and "Reset" buttons.

The left sidebar contains a menu with the following items:
- HST Target Search
- HST Abstract Search
- FAQ
- Search & Retrieval
- Daily Data Reports
- About HST Data
- High-Level Science Products
- Data Reduction & Analysis
- Catalogs
- Proposal Support
- Proprietary Rights
- Documentation
- Gallery
- Related Sites

The bottom of the browser window shows the Windows taskbar with the Start button and several open applications: Nicolas Andre..., 2 Microsoft Of..., Inbox for ndr..., Europlanet, Microsoft Power..., and 3 Mozilla. The system clock in the bottom right corner shows 15:13.

Illustration: Accessing HST observations (abstract search)

The screenshot shows a Mozilla browser window titled "MAST HST Abstract Search - Mozilla". The address bar displays the URL "http://archive.stsci.edu/hst/abstract.html". The page content includes a search bar, a "Print" button, and a list of search results. The first result is highlighted with a red circle and contains the following text:

HST Cycle 12 proposal [10083](#): **HST UV Images of Saturn's Aurora Coordinated with Cassini Solar Wind Measurements**
John T. Clarke - *Boston University*

A key measurement goal of the Cassini mission to Saturn is to obtain simultaneous solar wind and auroral imaging measurements in a campaign scheduled for Jan. 2004. Cassini will measure the solar wind approaching Saturn continuously from 9 Jan. - 6 Feb., but not closer to Saturn due to competing spacecraft orientation constraints. The only system capable of imaging Saturn's aurora in early 2004 will be HST. In this community DD proposal we request the minimum HST time needed to support the Cassini mission during the solar wind campaign with UV images of Saturn's aurora. Saturn's magnetosphere is intermediate between the "closed" Jovian case with large internal sources of plasma and the Earth's magnetosphere which is open to solar wind interactions. Saturn's aurora has been shown to exhibit large temporal variations in brightness and morphology from Voyager and HST observations. Changes of auroral emitted power exceeding one order of magnitude, dawn brightenings, and latitudinal motions of the main oval have all been observed. Lacking knowledge of solar wind conditions near Saturn, it has not been possible to determine its role in Saturn's auroral processes, nor the mechanisms controlling the auroral precipitation. During Cassini's upcoming approach to Saturn there will be a unique opportunity to answer these questions. We propose to image one complete rotation of Saturn to determine the corotational and longitudinal dependences of the auroral activity. We will then image the active sector of Saturn once every two days for a total coverage of 26 days during the Cassini campaign to measure the upstream solar wind parameters. This is the minimum coverage needed to ensure observations of the aurora under solar wind pressure variations of more than a factor of two, based on the solar wind pressure variations measured by Voyager 2 near Saturn on the declining phase of solar activity. The team of proposers has carried out a similar coordinated observing campaign of Jupiter during the Cassini flyby, resulting in a set of papers and HST images on the cover of Nature on 28 February 2002.

The browser's taskbar at the bottom shows the Start button, several open applications (Nicolas Andre..., 2 Microsoft Of..., Inbox for ndr..., Europlanet, Microsoft Power...), and 3 Mozilla windows. The system clock shows 15:17.

Illustration: Accessing the relevant HST observations (datasets)

MAST: HST - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop http://archive.stsci.edu/cgi-bin/proposal_search?id=10083&mission=hst Search Print

Data for proposal 10083 as of Tue Sep 11 13:17:59 GMT 2007

51 records (0 proprietary) returned.

Submit marked data for retrieval from STDADS

Mark all Unmark all Mark public Unmark public Mark proprietary Unmark proprietary

Row	Mark	Targname	RA	Dec	Instrument	Operating Mode	Cent Wave (Å)	Exp Time	Start Time	Dataset Name	Release Date	Ro
1	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 38 43.79	+22 29 07.83	STIS	ACCUM	1368.68	540.00	2004-01-10 04:41:15	O8WI01010	2004-01-10 09:02:22	1
2	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 38 44.03	+22 29 07.53	STIS	TIME-TAG	1453.25	640.20	2004-01-10 04:24:35	O8WI01S1Q	2004-01-10 08:59:51	2
3	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 38 43.59	+22 29 08.09	STIS	TIME-TAG	1453.25	640.20	2004-01-10 04:55:32	O8WI01S7Q	2004-01-10 09:10:25	3
4	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 25.64	+22 28 14.32	STIS	ACCUM	1368.68	540.00	2004-01-08 04:42:39	O8WI02010	2004-01-08 06:44:53	4
5	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 24.27	+22 28 16.08	STIS	ACCUM	1368.68	540.00	2004-01-08 06:16:45	O8WI02020	2004-01-08 10:47:48	5
6	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 22.87	+22 28 17.88	STIS	ACCUM	1368.68	540.00	2004-01-08 07:52:44	O8WI02030	2004-01-08 12:38:43	6
7	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 21.47	+22 28 19.67	STIS	ACCUM	1368.68	540.00	2004-01-08 09:28:43	O8WI02040	2004-01-08 21:28:42	7
8	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 20.07	+22 28 21.47	STIS	ACCUM	1368.68	540.00	2004-01-08 11:04:42	O8WI02050	2004-01-08 21:50:21	8
9	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 25.88	+22 28 14.02	STIS	TIME-TAG	1453.26	640.20	2004-01-08 04:25:59	O8WI02C6Q	2004-01-08 06:41:51	9
10	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 25.43	+22 28 14.59	STIS	TIME-TAG	1453.26	640.20	2004-01-08 04:56:56	O8WI02CCQ	2004-01-08 10:35:43	10
11	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 24.50	+22 28 15.79	STIS	TIME-TAG	1453.26	740.20	2004-01-08 05:58:25	O8WI02CHQ	2004-01-08 10:45:17	11
12	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 24.06	+22 28 16.35	STIS	TIME-TAG	1453.25	740.20	2004-01-08 06:31:02	O8WI02CNQ	2004-01-08 11:35:59	12
13	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 23.10	+22 28 17.58	STIS	TIME-TAG	1453.25	740.20	2004-01-08 07:34:24	O8WI02CSQ	2004-01-08 12:36:12	13
14	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 22.66	+22 28 18.15	STIS	TIME-TAG	1453.25	740.20	2004-01-08 08:07:01	O8WI02CYQ	2004-01-08 21:17:38	14
15	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 21.70	+22 28 19.38	STIS	TIME-TAG	1453.26	740.20	2004-01-08 09:10:23	O8WI02D3Q	2004-01-08 21:26:11	15
16	<input type="checkbox"/>	SATURN-AURORA-SOUTH	06 39 21.26	+22 28 19.94	STIS	TIME-TAG	1453.25	740.20	2004-01-08 09:43:00	O8WI02D9Q	2004-01-08 21:37:15	16

Start Nicolas Andre ... 2 Microsoft Of... Inbox for nandr... Europlanet Microsoft Power... 3 Mozilla 15:18


Illustration: Accessing the relevant HST observations (preview)

MAST: HST Preview - Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop <http://archive.stsci.edu/cgi-bin/mastpreview?mission=hst&dataid=08w102040> Search Print

Home Bookmarks



Preview calibrations are uncertain so preview data should be used for diagnostic/quick-look purposes only.

[FITS format](#) [More preview format options](#)

Exposure Information

Target Name: SATURN-AURORA-SOUTH	Observation Date: Jan 8 2004 9:28AM	Instrument: STIS
RA: 06 39 21.47	Exp Time: 540	Filter/Grating: MIRCUV
Dec: +22 28 19.67	Release Date: Jan 8 2004 9:28PM	Aperture: 25MAMA
Data Quality:	Mode: ACCUM	Config: STIS/FUV-MAMA
Quality Comment:		

Original observing program:
[10083](#) - Clarke, John T. - Boston University
HST UV Images of Saturn's Aurora Coordinated with Cassini Solar Wind Measurements
SOLAR SYSTEM - Cycle 12 - Status: completed

Retrieve Data

- [Information](#) on HST previews.
- Display FITS image using [Aladin](#).

Done

Start Nicolas Andre - ... 2 Microsoft Of... Inbox for ndr... Europlanet Microsoft Power... 3 Mozilla 16:27

Illustration: Visualizing HST observations with Aladin

The image shows a screenshot of the Aladin sky atlas web application running in a Mozilla browser window. The browser's address bar displays the URL: `http://archive.stsci.edu/cgi-bin/nph-aladin.pl?frame=launching&script=get+Local%28http%3A%2F%2Farchive.st...`. The application interface includes a menu bar with options: Load..., Save..., Tools..., Print..., Help..., and Detach. Below the menu bar, the 'Position' is set to 'J2000' and '&from=STSci'. The 'Pixel' resolution is set to '8 bits'. The main viewing area displays a grayscale astronomical image of a celestial object, with a yellow square highlighting a specific region. A toolbar on the right side of the image provides various interactive tools: select, dist, draw, tag, text, filter, rgb, assoc, tsamp, cont, zoom, mglss, and pixel. A vertical panel on the right contains a list of data sources: USNOB1, NED, Simbad, and O8W102040, each with a corresponding icon and a status indicator. The bottom status bar of the browser shows 'Applet cds.aladin.Aladin started'. The Windows taskbar at the very bottom of the screen shows several open applications, including Internet Explorer and various utility programs.



Beyond Aladin ?

Correcting HST observations

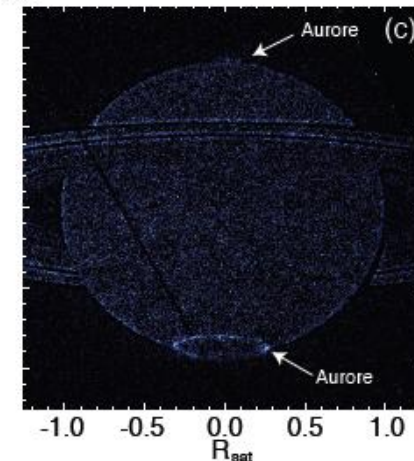
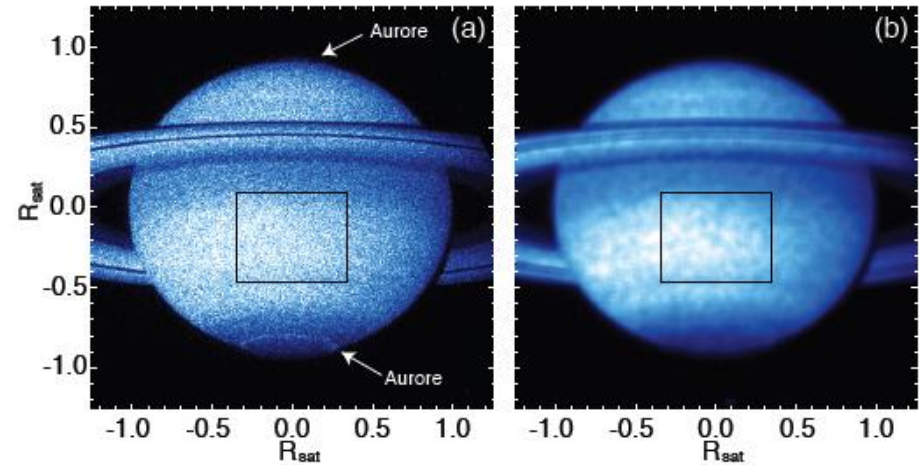
- Automated pre-treatment from HST pipeline:

(correction of dark background noise, flat field, geometrical distortion, absolute and wavelength photometric calibration, etc ...)

- **Additional corrections required :**

‘parasite’ emissions

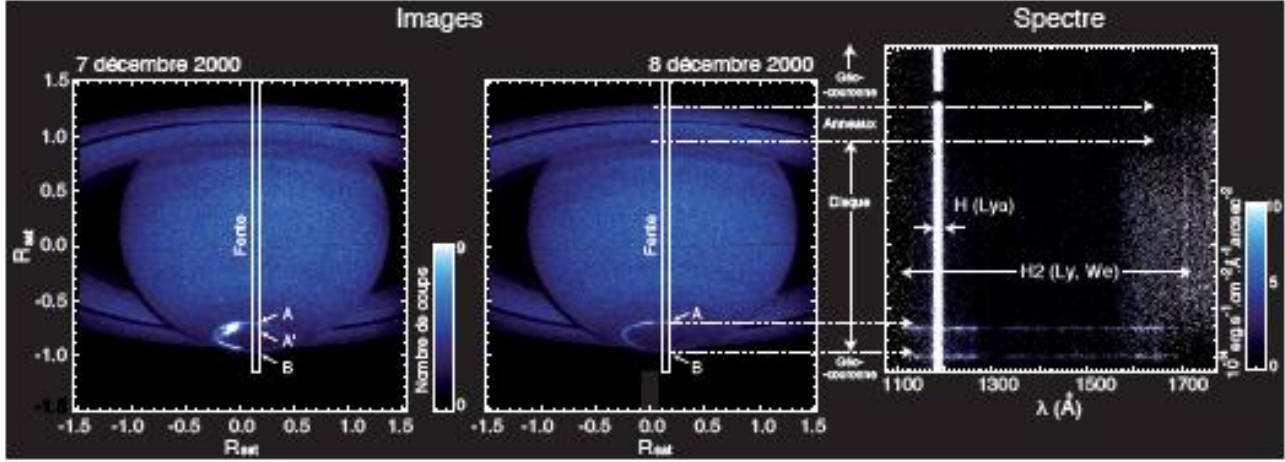
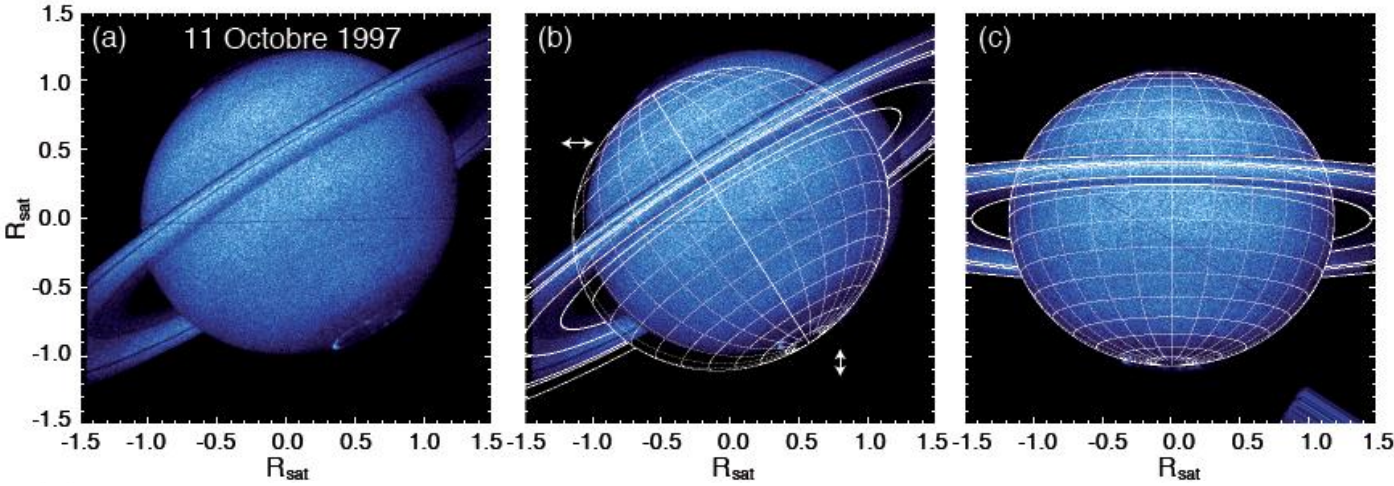
- Reflected flux by the planet
- diffused emissions (terrestrial geocorona)



Our expert: **Laurent Lamy** (LESIA, Imperial College)
PhD Thesis with Renée Prangé

Localizing HST observations in the observational plane

Laurent Lamy (PhD Thesis)



Projecting HST observations

Laurent Lamy (PhD Thesis)

+ in 'physical parameters'

e.g., power

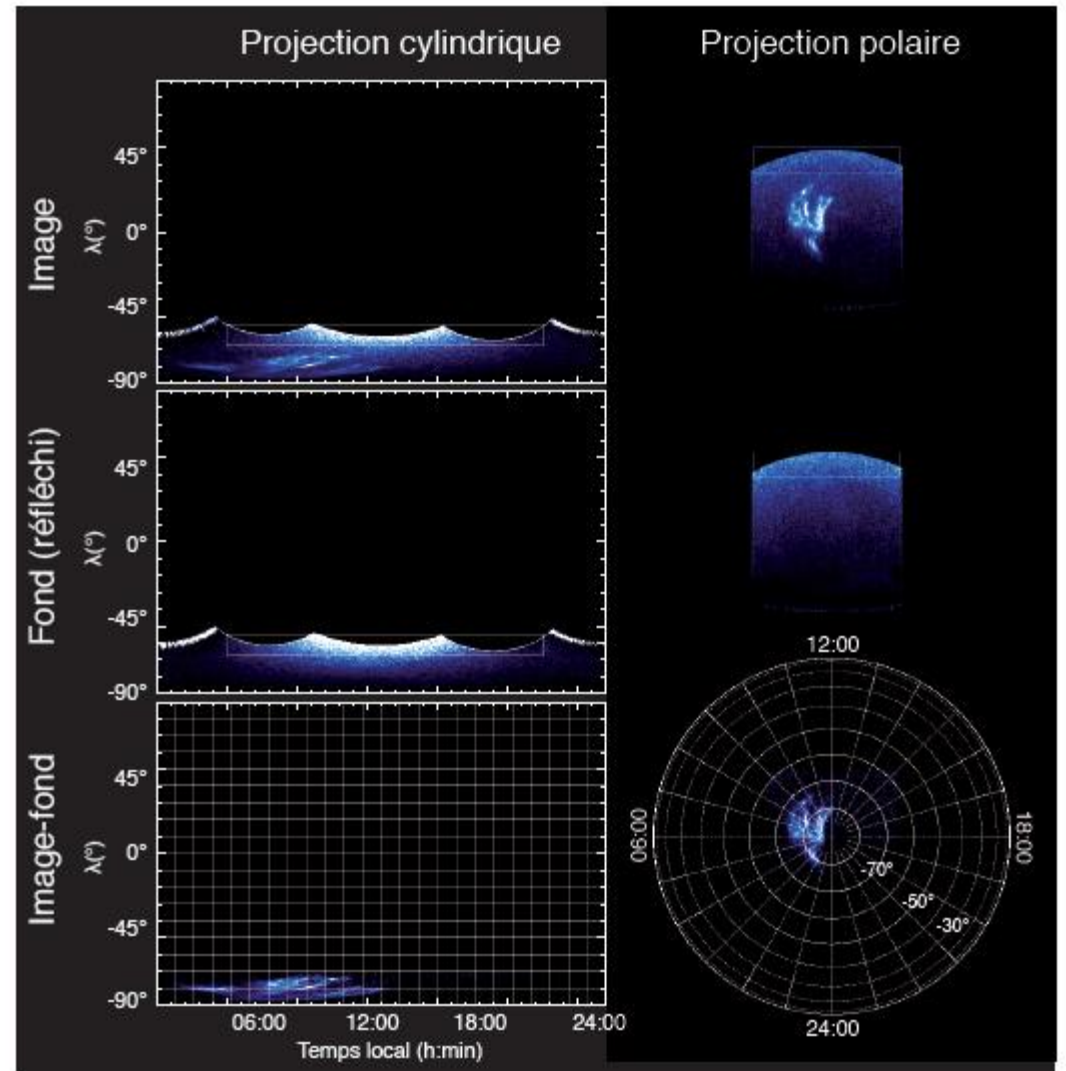
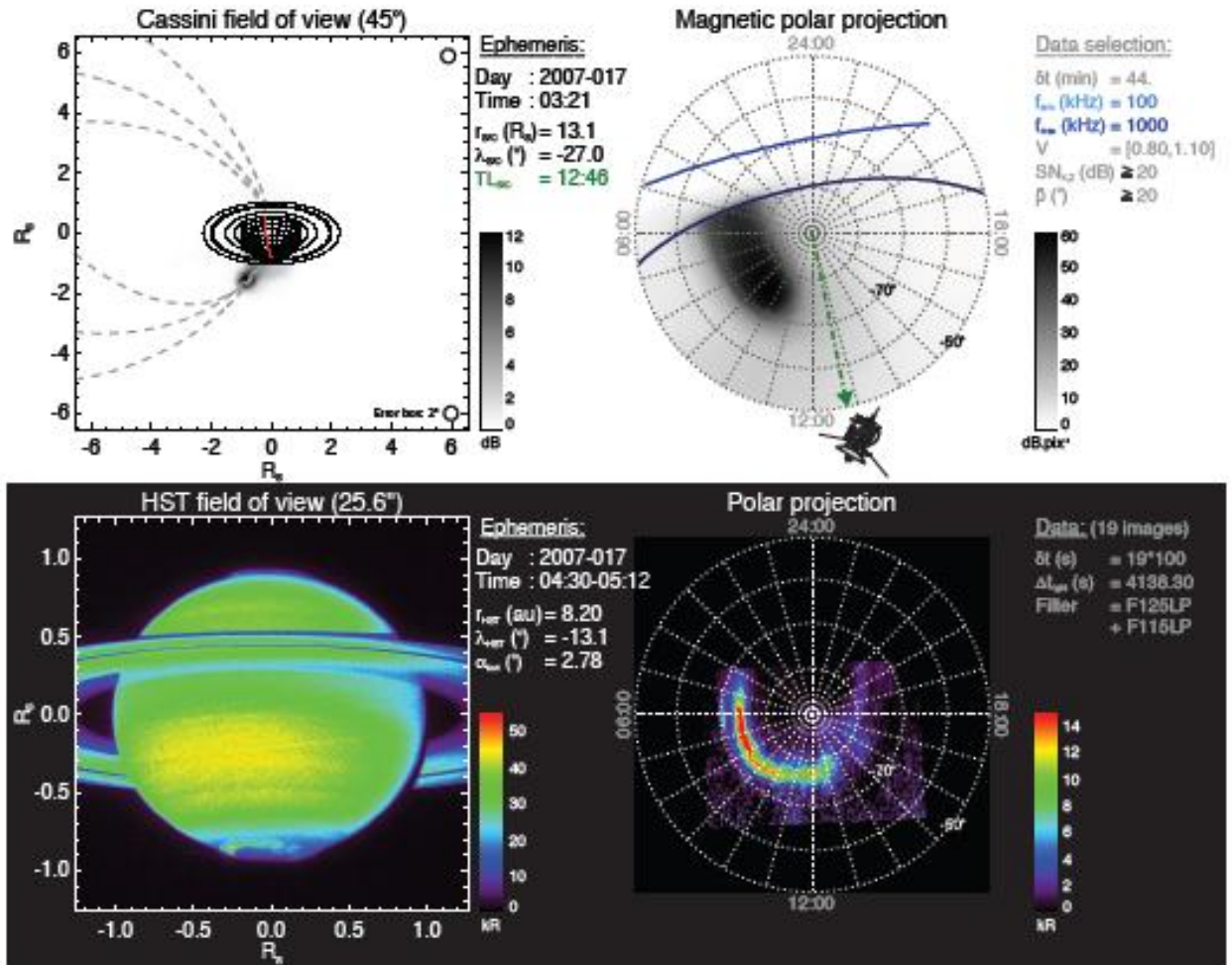


FIG. C.3: Projections cylindrique et polaire de l'image HST-STIS-SRF2 prise le 26 janvier 2004 à 19h16 (idem figure C.2e) ainsi que du réfléchi solaire déterminé pour le filtre SRF2 et la campagne 2004. Le fond soustrait sur les images finales a été lissé sur 20 pixels puis normalisé sur l'image à l'aide du rapport des intensités correspondant aux rectangles blancs.

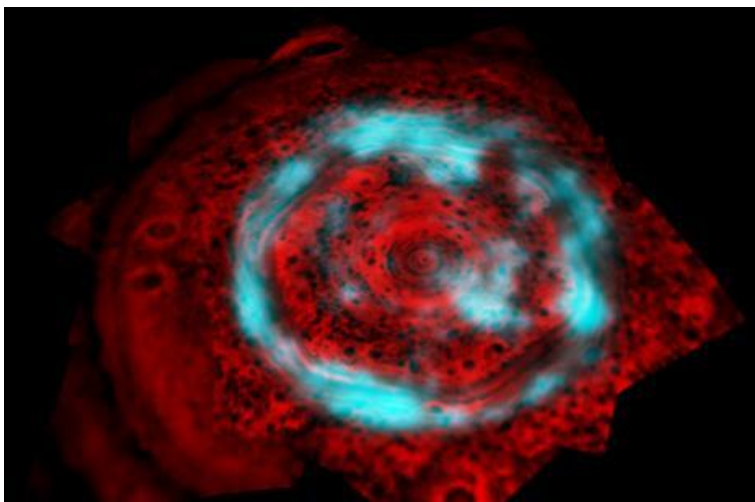
Correlating HST observations with radio observations

Laurent Lamy, JGR, 2009

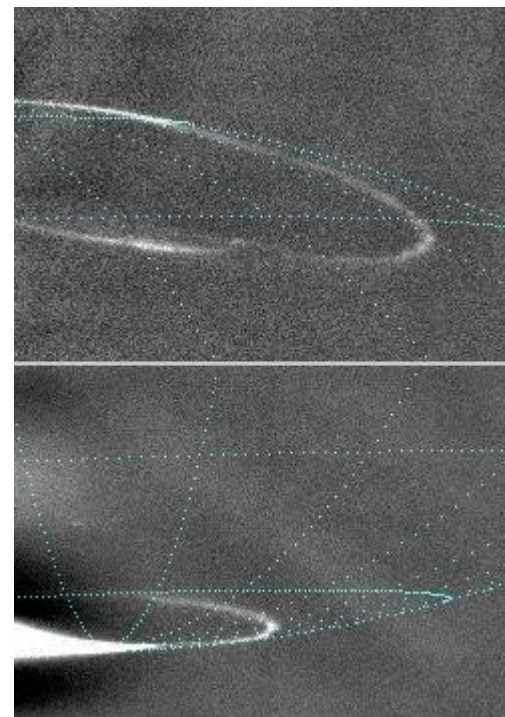


Correlating HST observations with X-ray, IR and VIS observations

Stallard et al., Nature, 2009



Cassini/ISS Image at Jupiter



Chandra Image
Jupiter

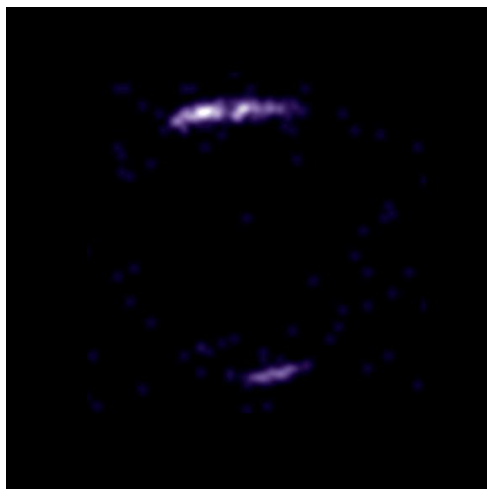


Illustration: HST observations (Specview)

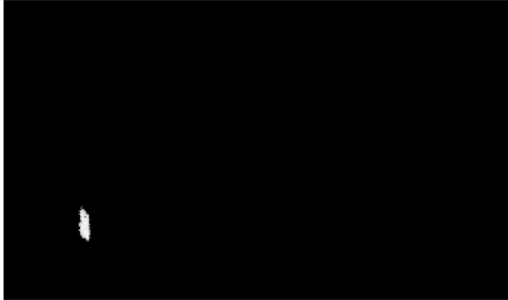
MAST: HST Preview - Mozilla Firefox

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http://archive.stsci.edu/cgi-bin/mastpreview?mission=hst&dataid=O6BAA65SQ

Les plus visités Débuter avec Firefox À la une

Courrier :: Boîte de réception Europe1 : Radio d'Actualité et News Pol... HSTONLINE Search MAST: HST Preview



Preview calibrations are uncertain so preview data should be used for diagnostic/quick-look purposes only.

[Preview in FITS format](#) [More preview format options](#)

Exposure Information

Target Name: JUP-SOUTH2	Observation Date: Jan 13 2001 8:16PM	Instrument: STIS
RA: 03 57 46.90	Exp Time: 260.018	Filter/Grating: G140L
Dec: +19 41 47.71	Release Date: Jan 13 2002 8:20PM	Aperture: 52X0.5
Data Quality: OK	Mode: TIME-TAG	Config: STIS/FUV-MAMA
Quality Comment: NO APPARENT PROBLEMS		

Original observing program:
[8657](#) - Clarke, John T. - Boston University
Jovian Auroral Variability Due to the Solar Wind/Magnetosphere Interaction
SOLAR SYSTEM - Cycle 9 - Status: completed

Recently available

[Retrieve Data](#)

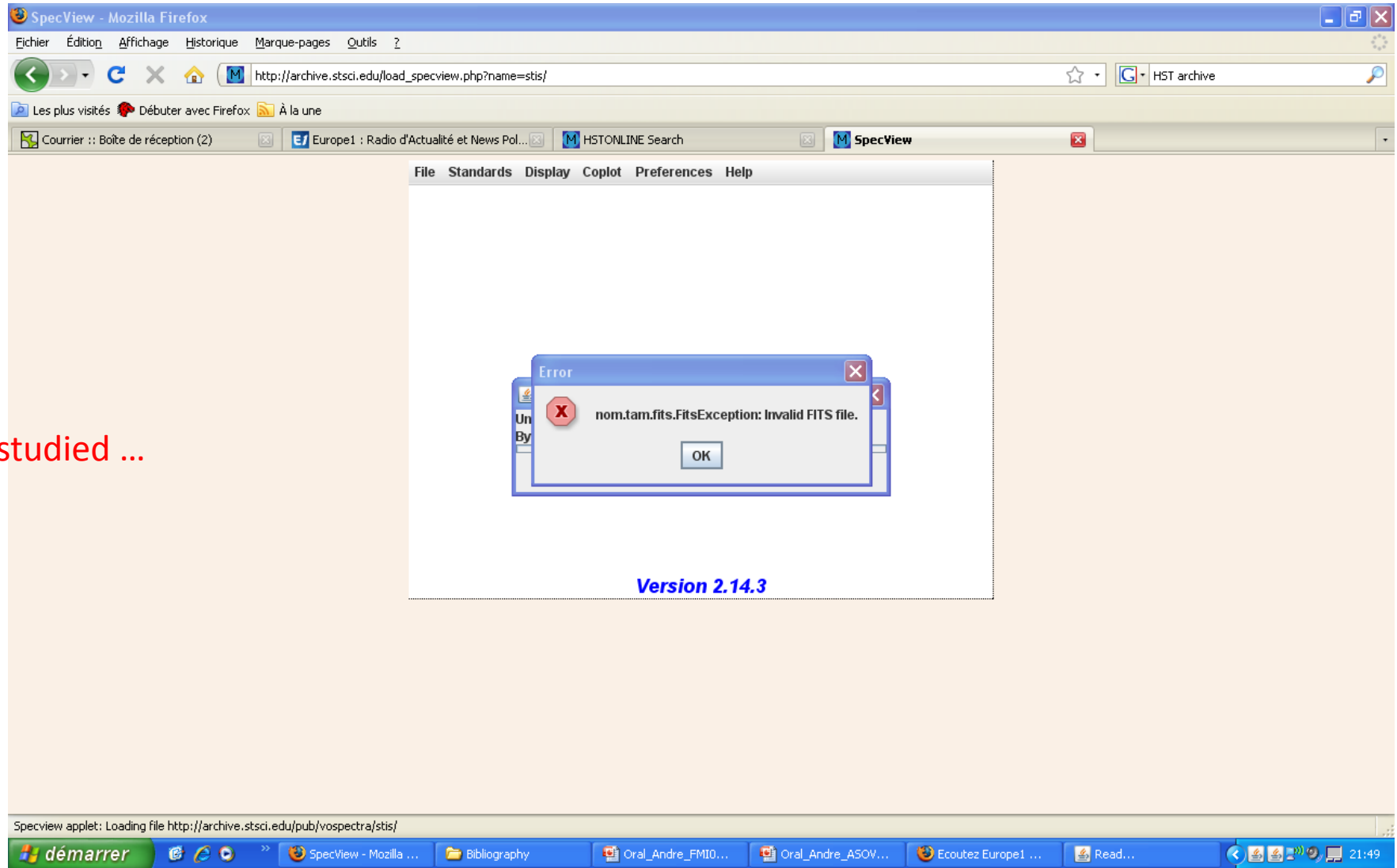
Information on HST previews.
View/Customize [plot of preview data](#)
Display / Customize [plot of VO FITS file using Specview](#). **NEW**
Paper(s) referencing "8657":

1. **Jupiter's main auroral oval observed with HST STIS** -- Grodent, D., Clarke, J.T., Kim, J., Waite, J.H., Cowley, S.W.H. - [2003JGRA.108kSMP2G](#)
2. **Jupiter's main auroral oval observed with HST STIS** -- Grodent, D., Clarke, J.T., Kim, J., Waite, J.H., Cowley, S.W.H. - [2003JGRA.108.1389G](#)
3. **Simultaneous Chandra X ray, Hubble Space Telescope ultraviolet, and Ulysses radio observations of Jupiter's aurora** -- Elsner, R. F., Lugaz, N., Waite, J.H., Cravens, T.E., Gladstone, G.R., Ford, P., Grodent, D., Bhardwaj, A., MacDowall, R.J., Desch, M.D., Majeed, T. - [2005JGRA.11001207E](#)
4. **Jupiter's polar auroral emissions** -- Grodent, D., Clarke, J.T., Waite, J.H., Cowley, S.W.H., Gerard, J.-C., Kim, J. - [2003JGRA.108iSMP6G](#)

Terminé

démarrer MAST: HST Preview - ... Bibliography Oral_Andre_FMI09 [... Oral_Andre_ASOV09 ... Ecoutez Europe1 en ... 21:46

Illustration: HST observations (Specview)



To be studied ...

Our proposed approach

Data Finder:

learn how to find all existing astronomical giant planet auroral observations (-> Time-Table, catalogue)

- 1) in UV (e.g., from the HST Science Data Archive),
- 2) in X-ray (e.g., from the XMM-Newton Science Archive)
- 3) in IR and 4) in Radio, using available astronomical catalogues, VO and associated search engines

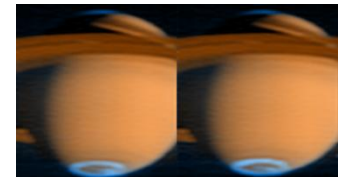
Data Access:

learn how to understand and read the corresponding data and metadata, together with their calibration files (standard(s), protocol(s), ...)

Use of Existing Tools:

learn how to use the VO tools mentioned previously with the corresponding astronomical data

- 1) as they stand,
- 2) also with existing planetary data on giant planet auroral emissions obtained from planetary spacecraft (e.g., from the Cassini UVIS, Cassini VIMS, Galileo UVS instruments at PDS),
- 3) identify the technical and scientific limitations (if any) of these VO tools in order to satisfy our requirements



Adaptation of Existing Tools to our Needs:

learn how to extend the existing tools and develop relevant and associated Added Value Services in order to fully satisfy our requirements

Connection between AMDA and VO tools:

learn how to connect our AMDA service with corresponding data and tools in an interoperable or integrated way

Submitted to Euro-VO for funding but unfortunately not funded ...