



EuroPlaNet N7 -
Plasma Node

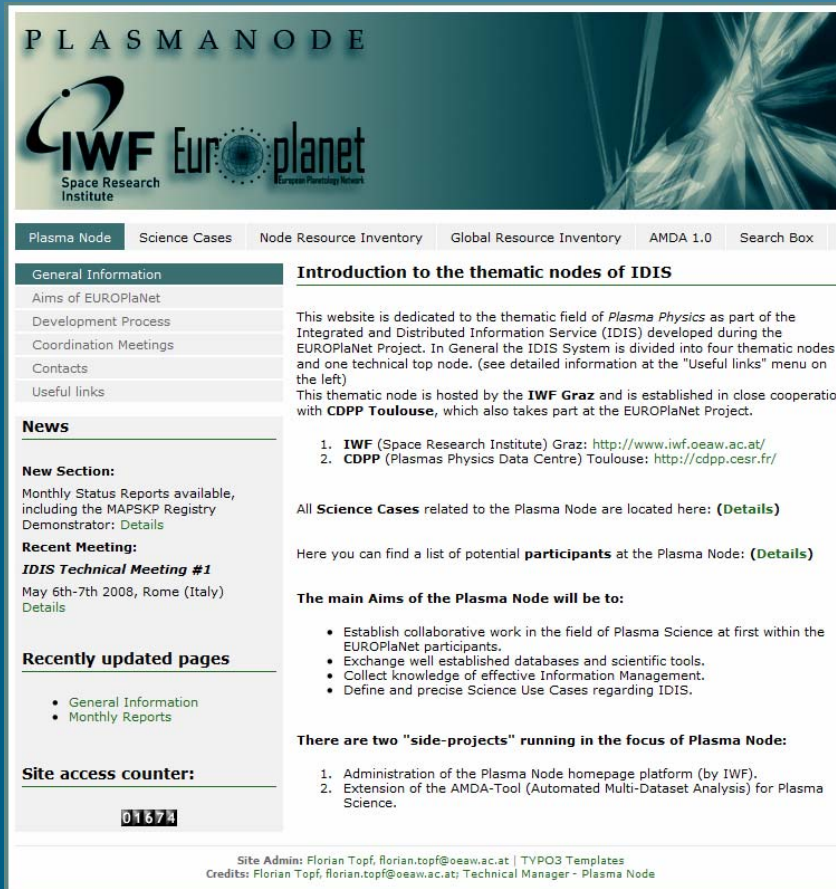
Development Status of Science Cases

Florian Topf, florian.topf@oeaw.ac.at

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

Plasma Node - Homepage

New clearly arranged structure



PLASMA NODE

IWF Space Research Institute

EUROPLANET European Planetary Network

Plasma Node | Science Cases | Node Resource Inventory | Global Resource Inventory | AMDA 1.0 | Search Box

General Information

- Aims of EUROPlaNet
- Development Process
- Coordination Meetings
- Contacts
- Useful links

News

New Section:
Monthly Status Reports available, including the MAPSKP Registry Demonstrator: [Details](#)

Recent Meeting:
IDIS Technical Meeting #1
May 6th-7th 2008, Rome (Italy)
[Details](#)

Recently updated pages

- General Information
- Monthly Reports

Site access counter:

01674

Introduction to the thematic nodes of IDIS

This website is dedicated to the thematic field of *Plasma Physics* as part of the Integrated and Distributed Information Service (IDIS) developed during the EUROPlaNet Project. In General the IDIS System is divided into four thematic nodes and one technical top node. (see detailed information at the "Useful links" menu on the left)

This thematic node is hosted by the **IWF Graz** and is established in close cooperation with **CDPP Toulouse**, which also takes part at the EUROPlaNet Project.

- IWF** (Space Research Institute) Graz: <http://www.iwf.oeaw.ac.at/>
- CDPP** (Plasma Physics Data Centre) Toulouse: <http://cdpp.cesr.fr/>

All **Science Cases** related to the Plasma Node are located here: [\(Details\)](#)

Here you can find a list of potential **participants** at the Plasma Node: [\(Details\)](#)

The main Aims of the Plasma Node will be to:

- Establish collaborative work in the field of Plasma Science at first within the EUROPlaNet participants.
- Exchange well established databases and scientific tools.
- Collect knowledge of effective Information Management.
- Define and precise Science Use Cases regarding IDIS.

There are two "side-projects" running in the focus of Plasma Node:

- Administration of the Plasma Node homepage platform (by IWF).
- Extension of the AMDA-Tool (Automated Multi-Dataset Analysis) for Plasma Science.

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Credits: Florian Topf, florian.topf@oeaw.ac.at; Technical Manager - Plasma Node

- Plasma Node (General Information)
- Science Cases
- Node Resource Inventory (NRI)
- Global Resource Inventory (GRI/external)
- AMDA 1.0 (external)
- Search Box

Plasma Node - Science Cases

New Homepage Section

PLASMANODE

IWF Space Research Institute | Eurplanet European Planetary Network

Plasma Node | Science Cases | Node Resource Inventory | Global Resource Inventory | AMDA 1.0 | Search Box

Plasma Node Science Cases:

Actually there are 4 **Science Cases** dedicated to the Plasma Node: (click on the numbering to get to the Science Case Overview)

- **SC 3.1 - Solar wind interaction with Jupiter and Saturn aurorae.**
- **SC 3.2 - What is the origin of the planetary modulated (quasi-periodic) signatures at saturn?**
- **SC 3.3 - Investigation of the interaction of magnetospheric plasma with icy moons in the Saturnian system and other giant planet systems.**
- **SC 3.4 - Planets under extreme stellar conditions**

After establishing these Aims we can assemble **Use Cases** to find out the needs of a scientists in a particular topic.

These **Use Cases** will help us to call for new Requirements of the whole **IDIS System** like:

- **Implementation Requirements**
- **Service Requirements**
- **Data related Requirements**
- **Communication Requirements**

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Credits: Florian Topf, florian.topf@oeaw.ac.at; Technical Manager - Plasma Node

- Plasma Node Science Cases (listing)
- SC 3.1 (finished)
- SC 3.2 (under construction)
- SC 3.3 (under construction)
- SC 3.4 (under construction)
- Related Documents




Plasma Node - Science Cases

New Homepage Section



SC 3.1 - *Solar wind interaction with Jupiter and Saturn aurorae.*

SC 3.2 - *What is the origin of the planetary modulated (quasi-periodic) signatures at saturn?*



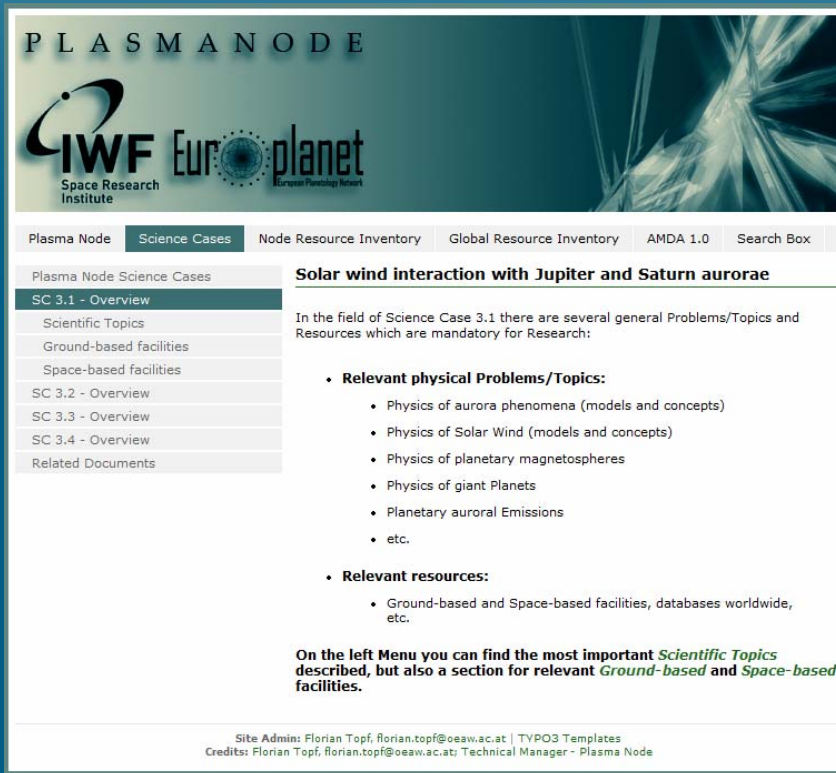
SC 3.3 - *Investigation of the interaction of magnetospheric plasma with icy moons in the Saturnian system and other giant planet systems.*

SC 3.4 - *Planets under extreme stellar/solar conditions*



Plasma Node - Science Cases

SC 3.1 - „Solar wind interaction with Jupiter and Saturn“



The screenshot shows the Plasma Node website interface. At the top, there is a navigation bar with the following items: Plasma Node, Science Cases (highlighted), Node Resource Inventory, Global Resource Inventory, AMDA 1.0, and Search Box. Below the navigation bar, there is a sidebar menu on the left with the following items: Plasma Node Science Cases, SC 3.1 - Overview (highlighted), Scientific Topics, Ground-based facilities, Space-based facilities, SC 3.2 - Overview, SC 3.3 - Overview, SC 3.4 - Overview, and Related Documents. The main content area displays the title "Solar wind interaction with Jupiter and Saturn aurorae" and a brief introduction: "In the field of Science Case 3.1 there are several general Problems/Topics and Resources which are mandatory for Research:". Below this, there are two sections: "Relevant physical Problems/Topics:" and "Relevant resources:". The "Relevant physical Problems/Topics:" section lists: Physics of aurora phenomena (models and concepts), Physics of Solar Wind (models and concepts), Physics of planetary magnetospheres, Physics of giant Planets, Planetary auroral Emissions, and etc. The "Relevant resources:" section lists: Ground-based and Space-based facilities, databases worldwide, etc. At the bottom of the page, there is a footer with the text: "Site Admin: Florian Topf, florian.topf@oeaw.ac.at | TYPO3 Templates Credits: Florian Topf, florian.topf@oeaw.ac.at; Technical Manager - Plasma Node".

- SC 3.1 Overview
 - Relevant physical Problems / Topics
 - Relevant Resources
- Scientific Topics
- Ground-based facilities
- Space-based facilities

Plasma Node - Science Case 3.1

Selected Scientific Topics

PLASMANODE

IWF Space Research Institute

Europlanet

Plasma Node | Science Cases | Node Resource Inventory | Global Resource Inventory | AMDA 1.0 | Search Box

Plasma Node Science Cases

SC 3.1 - Overview

Scientific Topics

- CMEs and Shocks in Solar Wind
- Giant Planets magnetospheres
- Moons influence on SKR
- Satellite influences on aurorae
- Solar Wind influence on HOM/DAM
- Solar Wind influence on SKR
- Ground-based facilities
- Space-based facilities

SC 3.2 - Overview

SC 3.3 - Overview

SC 3.4 - Overview

Related Documents

Relevant Scientific Topics

You can either click on one of the boxes or choose a topic on the left menu to get to its description:

Solar Wind (S.W.)

Jupiter Aurora

Saturn Aurora

Satellite influences on aurorae

CMEs and Shocks in S.W.

S.W. Influence on SKR

Moons influence on SKR

Giant Planets magnetospheres

S.W. Influence on HOM/DAM

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- CMEs and Shocks in Solar Wind
- Giant Planets magnetospheres
- Moons influence on SKR
- Satellite influences on aurorae
- Solar Wind influence on HOM/DAM
- Solar Wind influence on SKR

Plasma Node - Science Case 3.1

Topic Example: „Solar Wind influence on SKR“

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Plasma Node | Science Cases | Node Resource Inventory | Global Resource Inventory | AMDA 1.0 | Search Box

Plasma Node Science Cases

- SC 3.1 - Overview
- Scientific Topics
 - CMEs and Shocks in Solar Wind
 - Giant Planets magnetospheres
 - Moons influence on SKR
 - Satellite influences on aurorae
 - Solar Wind influence on HOM/DAM
 - Solar Wind influence on SKR**
 - Ground-based facilities
 - Space-based facilities
- SC 3.2 - Overview
- SC 3.3 - Overview
- SC 3.4 - Overview
- Related Documents

Solar Wind influence on Saturn Kilometric Radiation

Problem Description:

Since the Voyager mission it is known that Saturn Kilometric adiation (SKR) is strongly influenced by external forces, i.e., the solar wind and in particular the solar wind ram pressure.

Saturn kilometric radiation (SKR) is an intense auroral non-thermal radio emission with comparable characteristics to the Earth's Auroral Kilometric Radiation (AKR) (Kaiser et al., 1984). A series of papers have provided further evidence that the SKR is strongly controlled by the solar wind, in particular by the solar ram pressure (Desch, 1982; Desch and Rucker, 1983; Desch and Rucker, 1985).

The long term variability of SKR can also be seen at periodicities ~ 13 days and ~ 25 days due to the response of an occasional two-sector interplanetary magnetic field structure in the solar wind data (Lecacheux et al., 1997). Specific plasma instabilities such as the central flute instability, as outlined by Curtis et al. (1986), and initiating electron precipitation by the Kelvin-Helmholtz instability (Galopeau et al., 1995) or, alternatively, by existing upwards field-aligned currents between open and close magnetic field lines at the morning side of the Saturnian magnetosphere (Cowley et al., 2004) may be driving processes for the generation of SKR. The relation between SKR and Saturn's aurorae has recently been investigated using Cassini RPWS data (Gurnett et al., 2004) and Hubble Space Telescope (HST) observations suggesting an Earth-like correspondence between bright auroral features and SKR (Kurth et al., 2005).

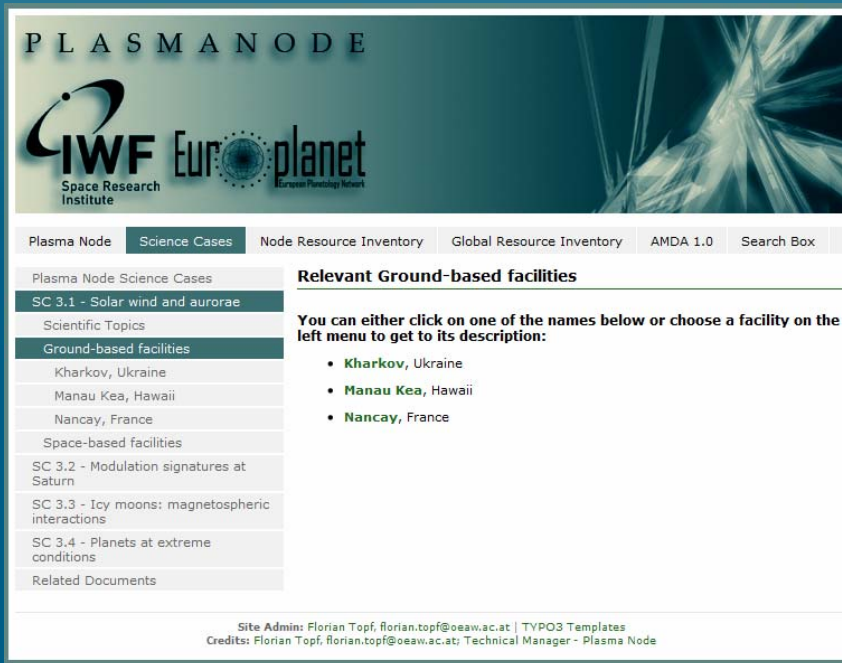
Fig. 1: Correlation coefficients between the SKR profile and S.W. parameters measured by Cassini

References:

- Problem Description: Illustration of the Scientific problem
- References: Referred documents in the text and additions
- Resources: (TBD) Own dataproducts, external links from NRA

Plasma Node - Science Case 3.1

Selected Ground-based facilities



The screenshot shows the PLASMANODE website interface. At the top, there are logos for IWF (Space Research Institute), Europlanet (European Planetary Network), and PLASMANODE. Below the logos is a navigation menu with tabs for Plasma Node, Science Cases, Node Resource Inventory, Global Resource Inventory, AMDA 1.0, and a Search Box. The main content area is titled 'Relevant Ground-based facilities' and includes a sub-header 'SC 3.1 - Solar wind and aurorae'. A left sidebar menu lists various categories: Scientific Topics, Ground-based facilities (highlighted), Space-based facilities, SC 3.2 - Modulation signatures at Saturn, SC 3.3 - Icy moons: magnetospheric interactions, SC 3.4 - Planets at extreme conditions, and Related Documents. The main content area contains the text: 'You can either click on one of the names below or choose a facility on the left menu to get to its description:' followed by a bulleted list of facilities: Kharkov, Ukraine; Manau Kea, Hawaii; and Nancay, France.

PLASMANODE

IWF Space Research Institute

Europlanet European Planetary Network

Plasma Node Science Cases Node Resource Inventory Global Resource Inventory AMDA 1.0 Search Box

Plasma Node Science Cases

SC 3.1 - Solar wind and aurorae

Scientific Topics

Ground-based facilities

Kharkov, Ukraine

Manau Kea, Hawaii

Nancay, France

Space-based facilities

SC 3.2 - Modulation signatures at Saturn

SC 3.3 - Icy moons: magnetospheric interactions

SC 3.4 - Planets at extreme conditions

Related Documents

Relevant Ground-based facilities

You can either click on one of the names below or choose a facility on the left menu to get to its description:

- **Kharkov**, Ukraine
- **Manau Kea**, Hawaii
- **Nancay**, France

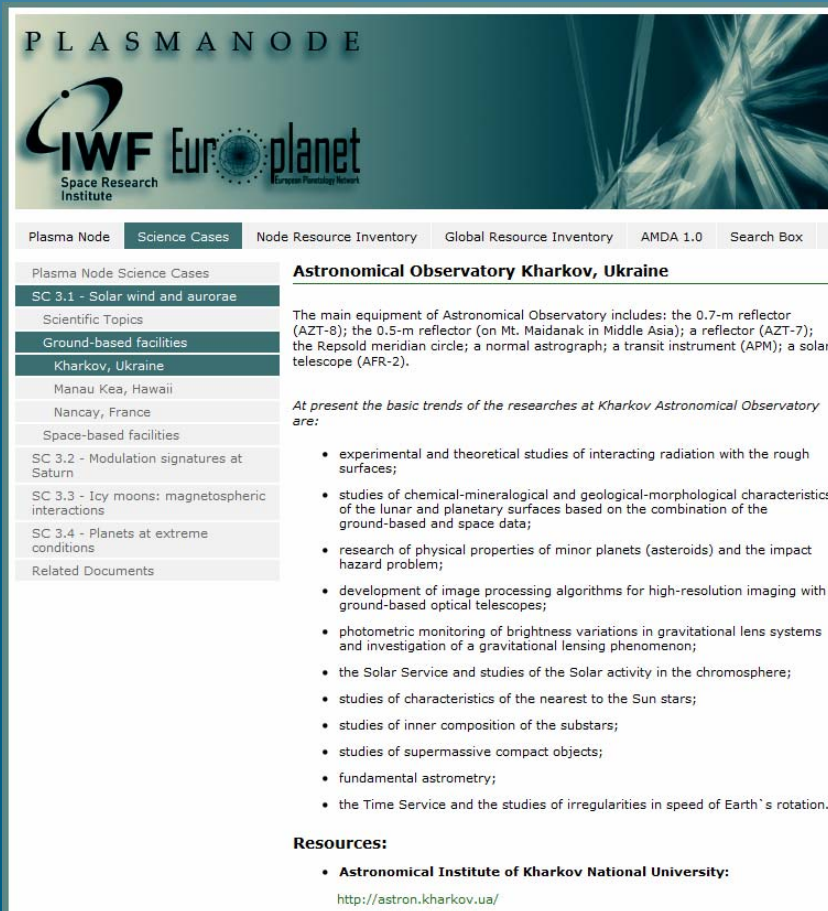
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Credits: Florian Topf, florian.topf@oeaw.ac.at; Technical Manager - Plasma Node

Related Facilities:
(already linked in the NRI)

- Nancay, France
- Kharkov, Ukraine
- Manau Kea, Hawaii

Plasma Node - Science Case 3.1

Facility Example: Kharkov, Ukraine



The screenshot shows the PLASMA NODE website interface. At the top, there are logos for IWF Space Research Institute, Europlanet, and the European Planetary Robot. Below the logos is a navigation bar with tabs for Plasma Node, Science Cases, Node Resource Inventory, Global Resource Inventory, AMDA 1.0, and a Search Box. The main content area is titled "Astronomical Observatory Kharkov, Ukraine". It features a sidebar on the left with a tree view of Science Cases, where "SC 3.1 - Solar wind and aurorae" is selected. The main content area contains a description of the facility's equipment, a list of basic research trends, and a list of resources.

PLASMA NODE

IWF Space Research Institute | Europlanet | European Planetary Robot

Plasma Node | **Science Cases** | Node Resource Inventory | Global Resource Inventory | AMDA 1.0 | Search Box

Plasma Node Science Cases

- SC 3.1 - Solar wind and aurorae**
- Scientific Topics
- Ground-based facilities
 - Kharkov, Ukraine**
 - Manau Kea, Hawaii
 - Nancay, France
- Space-based facilities
- SC 3.2 - Modulation signatures at Saturn
- SC 3.3 - Icy moons: magnetospheric interactions
- SC 3.4 - Planets at extreme conditions
- Related Documents

Astronomical Observatory Kharkov, Ukraine

The main equipment of Astronomical Observatory includes; the 0.7-m reflector (AZT-8); the 0.5-m reflector (on Mt. Maidanak in Middle Asia); a reflector (AZT-7); the Repsold meridian circle; a normal astrograph; a transit instrument (APM); a solar telescope (AFR-2).

At present the basic trends of the researches at Kharkov Astronomical Observatory are:

- experimental and theoretical studies of interacting radiation with the rough surfaces;
- studies of chemical-mineralogical and geological-morphological characteristics of the lunar and planetary surfaces based on the combination of the ground-based and space data;
- research of physical properties of minor planets (asteroids) and the impact hazard problem;
- development of image processing algorithms for high-resolution imaging with ground-based optical telescopes;
- photometric monitoring of brightness variations in gravitational lens systems and investigation of a gravitational lensing phenomenon;
- the Solar Service and studies of the Solar activity in the chromosphere;
- studies of characteristics of the nearest to the Sun stars;
- studies of inner composition of the substars;
- studies of supermassive compact objects;
- fundamental astrometry;
- the Time Service and the studies of irregularities in speed of Earth's rotation.

Resources:

- **Astronomical Institute of Kharkov National University:**
<http://astron.kharkov.ua/>

- Overview:
Description of the facilities equipment
- Objectives:
Scientific researches at the facility
- Resources:
Linklist from NRI

Plasma Node - Science Case 3.1

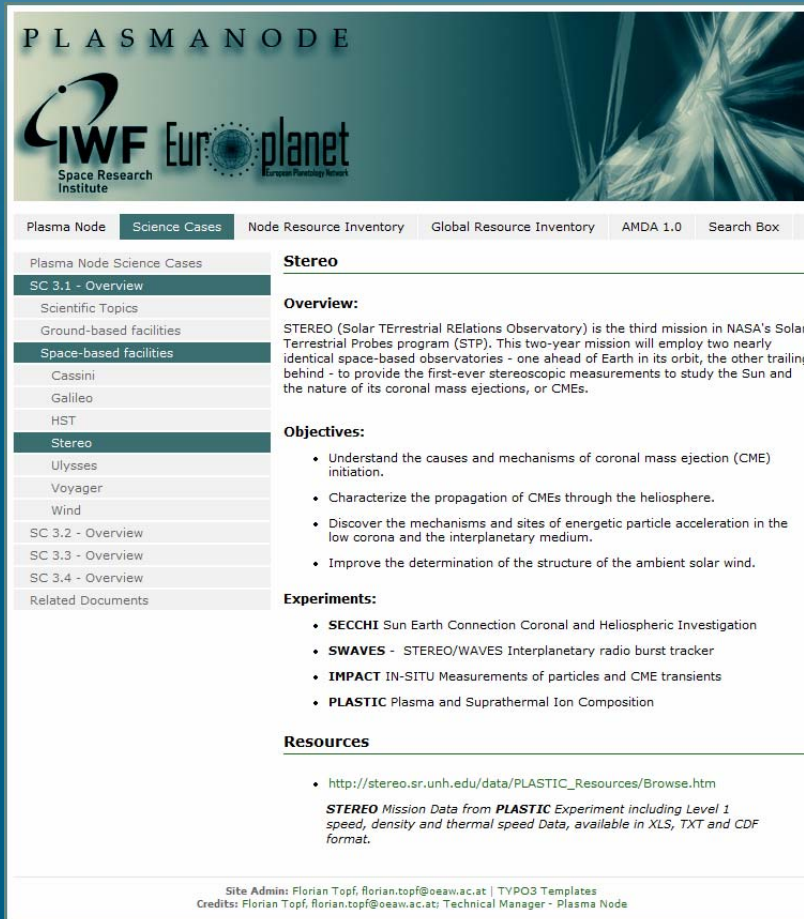
Selected Space-based facilities:

The screenshot shows the PLASMANODE website interface. At the top, there are logos for IWF Space Research Institute, Europlanet, and the European Partnership Network. Below the logos is a navigation menu with options: Plasma Node, Science Cases, Node Resource Inventory, Global Resource Inventory, AMDA 1.0, and Search Box. The main content area is titled "Plasma Node Science Cases" and lists several science cases, with "SC 3.1 - Overview" selected. Under "SC 3.1 - Overview", there are sub-sections for "Scientific Topics", "Ground-based facilities", and "Space-based facilities". The "Space-based facilities" section lists: Cassini, Galileo, HST, Stereo, Ulysses, Voyager, and Wind. To the right of this list is a diagram titled "Relevant Space-based facilities" with the instruction: "You can either click on one of the boxes or choose a Mission on the left menu to get to its description:". The diagram consists of three overlapping circles: "Solar Wind" (top), "Jupiter Aurora" (bottom left), and "Saturn Aurora" (bottom right). Lines connect mission names in blue boxes to the circles: Ulysses, Cassini, and Galileo are connected to the Solar Wind circle; Stereo, Wind, Voyager, and HST are connected to the Saturn Aurora circle.

- Cassini
- Galileo
- HST
- Stereo
- Ulysses
- Wind
- Voyager

Plasma Node - Science Case 3.1

Facility Example: „Stereo“



The screenshot shows the PLASMANODE website interface. At the top, there is a navigation bar with tabs for Plasma Node, Science Cases, Node Resource Inventory, Global Resource Inventory, AMDA 1.0, and a Search Box. The main content area is titled "Stereo" and includes an overview, objectives, experiments, and resources. The left sidebar contains a menu for Plasma Node Science Cases, with "SC 3.1 - Overview" selected. The overview text describes the STEREO mission as the third in NASA's Solar Terrestrial Probes program, featuring two identical space-based observatories. The objectives list understanding coronal mass ejection (CME) initiation, characterizing CME propagation, and improving solar wind determination. The experiments include SECCHI, SWAVES, IMPACT, and PLASTIC. Resources include a link to mission data and a note about the PLASTIC experiment data format.

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Plasma Node Science Cases

SC 3.1 - Overview

Scientific Topics

Ground-based facilities

Space-based facilities

Cassini

Galileo

HST

Stereo

Ulysses

Voyager

Wind

SC 3.2 - Overview

SC 3.3 - Overview

SC 3.4 - Overview

Related Documents

Stereo

Overview:

STEREO (Solar Terrestrial Relations Observatory) is the third mission in NASA's Solar Terrestrial Probes program (STP). This two-year mission will employ two nearly identical space-based observatories - one ahead of Earth in its orbit, the other trailing behind - to provide the first-ever stereoscopic measurements to study the Sun and the nature of its coronal mass ejections, or CMEs.

Objectives:

- Understand the causes and mechanisms of coronal mass ejection (CME) initiation.
- Characterize the propagation of CMEs through the heliosphere.
- Discover the mechanisms and sites of energetic particle acceleration in the low corona and the interplanetary medium.
- Improve the determination of the structure of the ambient solar wind.

Experiments:

- **SECCHI** Sun Earth Connection Coronal and Heliospheric Investigation
- **SWAVES** - STEREO/WAVES Interplanetary radio burst tracker
- **IMPACT** IN-SITU Measurements of particles and CME transients
- **PLASTIC** Plasma and Suprathermal Ion Composition

Resources

- http://stereo.sr.unh.edu/data/PLASTIC_Resources/Browse.htm

STEREO Mission Data from PLASTIC Experiment including Level 1 speed, density and thermal speed Data, available in XLS, TXT and CDF format.










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- Overview:
Introduction to the Mission
- Objectives:
Scientific aims of the Mission
- Experiments:
Related Instruments onboard
- Resources:
Linklist from NRI



Plasma Node - Science Cases

Future additions and extensions

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- Continuation of SC implementations with SC 3.4
 - Similar implementations of SC 3.2 and SC 3.3
 - Small working-groups responsible for the future content of each SC
 - Accounting for CMS - working-groups can change their dedicated topics
 - User Requirements and Use Case Section (WIKI?)



Thank you for listing!



Notes, further suggestions, even corrections
are most welcome!