

# Données et services dans l'Observatoire Virtuel



AS OV, SF2A 2007, Grenoble, F. Genova



EUROVO

# Les objectifs de l'Observatoire Virtuel

- Permettre aux scientifiques d'accéder facilement aux données et services disponibles en ligne
- Fournir des outils (traitement et analyse de données, visualisation, ...)

L'OV fournit un cadre (standards, outils) aux producteurs de service pour 'publier' leurs services dans l'OV



# Le statut du projet d'OV

- Depuis 2001: construction de l'infrastructure (standards d'interopérabilité, permettant de communiquer avec les services et de savoir ce qu'il y a dedans) par les équipes de l'OV
- Mise en service progressive de services OV, ou de fonctions rendues possible par l'OV dans des services pré-existants (ex. Aladin)
- L'AS OV coordonne la participation française
- Participation 'volontaire' des labos (pas de programme *eScience* en France)



# Groupes de travail AS OV

## Les points de contact

- *Spectroscopie*: C. Soubiran, P. Prugniel
- *Théorie*: H. Wozniak (ASSNA, WP4 DCA)
- *Workflow (VO-TECH)*: A. Schaaff, C. Surace, E. Slézak, F. Le Petit, P. Prugniel
- *Grille*: A. Schaaff, P. Valiron, H. Wozniak (WP5 DCA)
- *Géodésie et systèmes de référence- OV-GAFF (GRAAPH)*: F. Deleflie
- *Images*: E. Slézak
- *Planétologie*: A. Sarkissian



OV-France . GROUPEstravail . ObsVTheorie07jun18 - Mozilla Firefox

Fichier Édition Affichage Historique Marque-pages Outils ?

http://www.france-vo.org/tv

Windows era\_gp\_final\_en.pdf ... Mail :: Bienvenue sur ... CDS . Main . WebHome

11h45: Examples and demos of test implementation of services

- ♦ 11h45 : Millenium (GL)

13h00: Breakfast (ENS-L restaurant)

14h00: Examples and demos of test implementation of services (con't)

- ♦ 14h00 : [Horizon Cosmo](#) (JPL)
- ♦ 15h00 : [Horizon Galmer](#) (IG)
- ♦ 15h45 : [Besancon model](#) (BD)
- ♦ 16h30 : coffee break
- ♦ 16h45 : [PDR service](#) (FLP)
- ♦ 17h30 : [DALIA data model](#) (ML)
- ♦ 18h00 : [POLLUX](#) (HW for Ana Palacios, GRAAL)

Terminé



# Une nouvelle phase pour l'OV

- L'ensemble des standards est disponible
- Passage en phase opérationnelle, avec deux types d'interlocuteurs:
  - Les centres de données (de toutes tailles!)
    - l'AS OV a été un précurseur: tutoriels, recensement
    - Action de coordination européenne Euro-VO Data Centre Alliance (septembre 2006 – décembre 2008): Workshops, recensement
  - A renforcer: contacts avec les grands projets
  - Les scientifiques
    - Les services sont en ligne et peuvent être utilisés
    - Appel d'offre 'prototype' Euro-VO Research Initiative en mars 2007



# Comment impliquer la communauté scientifique? (1)

- Exposés/symposia/stands de démonstration dans des colloques généralistes (UAI, JENAM, SF2A): informations générales, mais impact?
- Colloques focalisés:
  - Euro-VO: Spectroscopy and the VO  
120 participants (dont 23 français)  
Un domaine où plusieurs projets nationaux avaient sensibilisé leurs communautés et où les équipes OV sont très actives; excellentes revues et discussions



# Comment impliquer la communauté scientifique? (2)

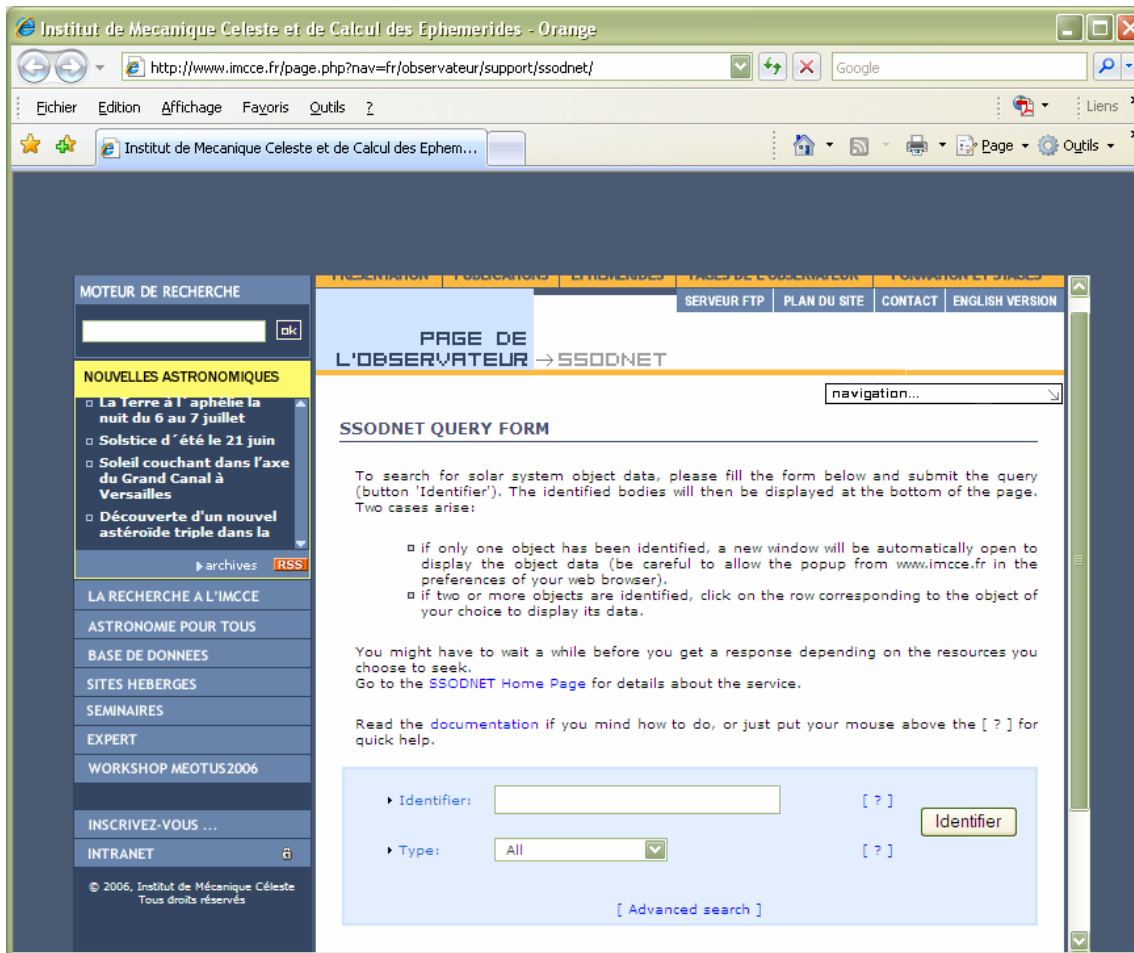
- Suggestion de thèmes?
- Proposition européenne en cours d'évaluation: financement d'Appels d'Offre, tutoriels en ligne, workshops
- Suggestions pour des actions en France?
- Des exposés pendant les Journées des PN, ciblés sur l'utilisation de l'OV dans le domaine?

Contact: correspondant du PN au CS de l'AS OV









‘Name resolver’  
pour les objets du  
système solaire  
Prototype

(J. Berthier)

Accès à des données distribuées, regroupées sur une  
même page: satellites, paramètres physiques, orbite,  
Observations, taxonomie



Elodie  
HyperLeda  
Fuse  
HIG  
Étoiles Be

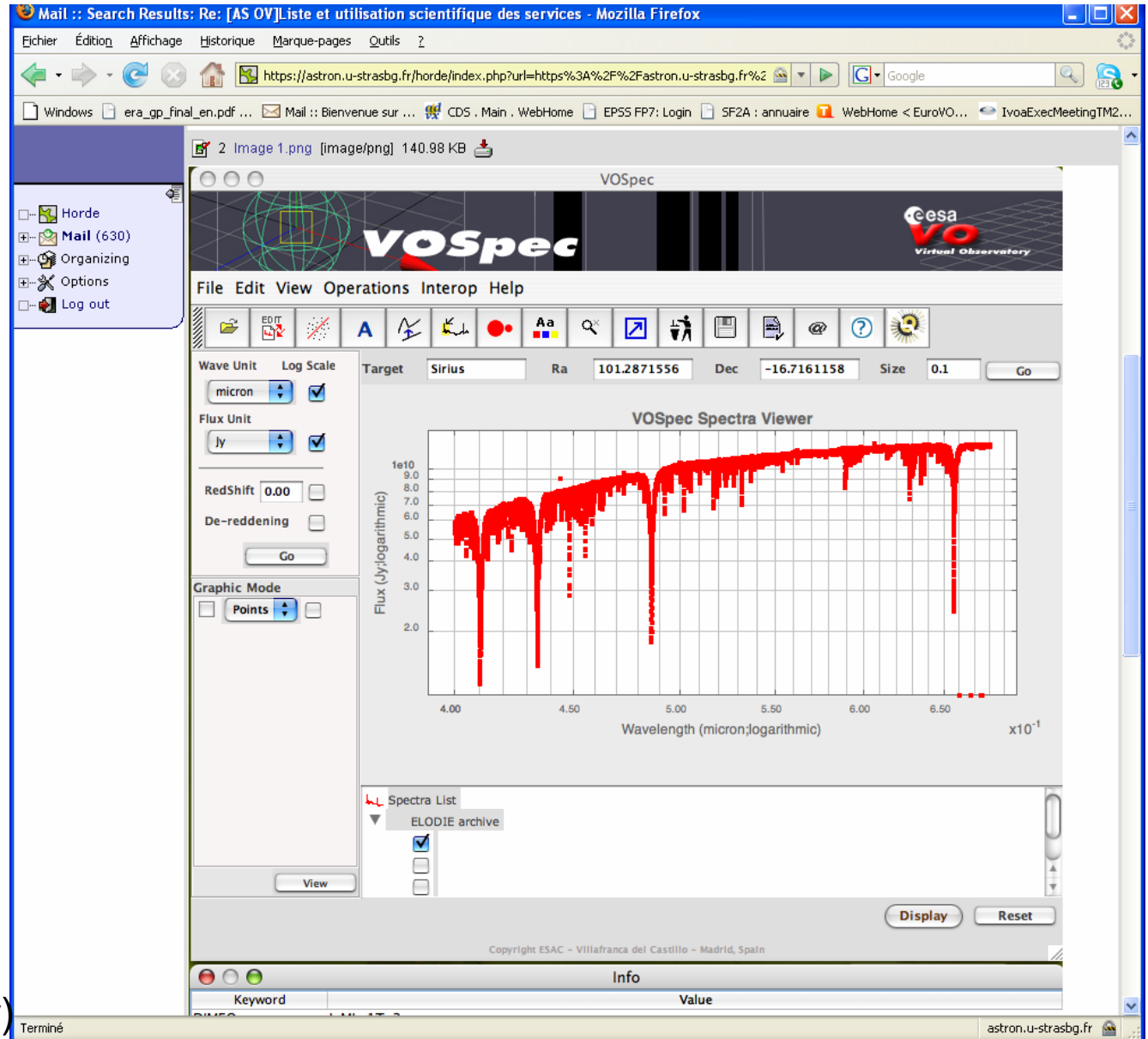
Aussi :

Bases de raies  
moléculaires

Ex utilisation:  
mesure H2O  
sur le long terme  
(Sarkissian)

(OHP, OP, IAP,  
CRAL)

(S. Ilovaisky)

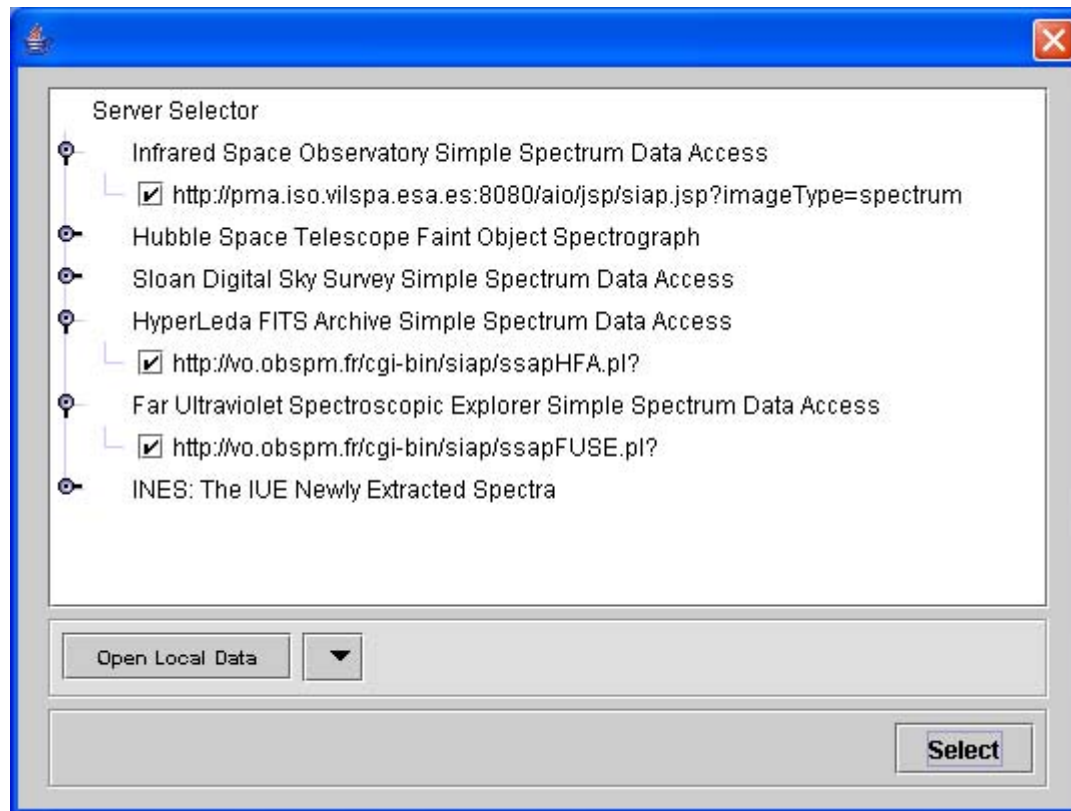


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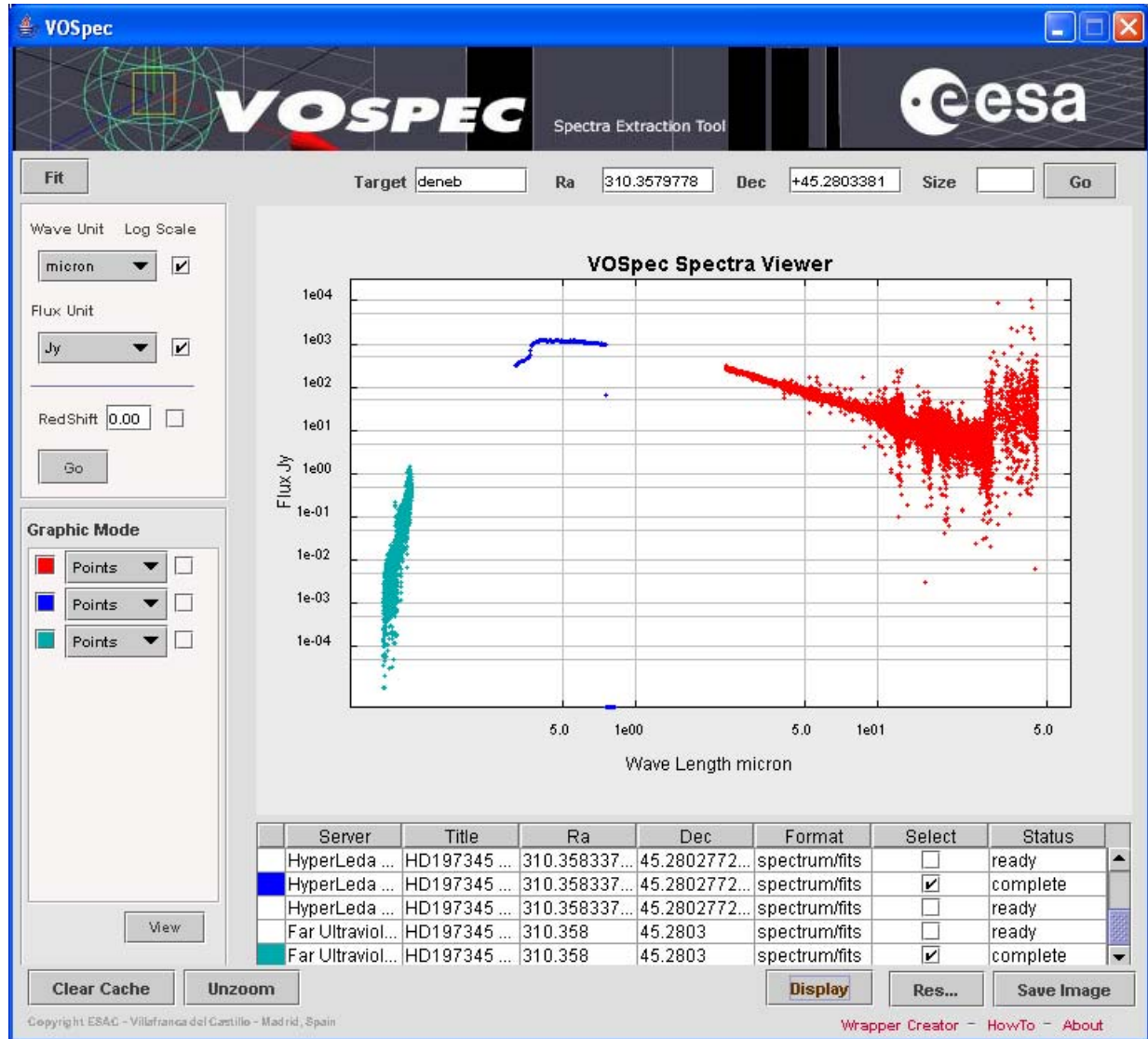


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# Accès VO à des archives spectrales



Collaboration  
 initiée à Pune  
 IAP  
 Obs. Paris  
 Obs. Lyon  
 ESAC, Espagne



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EUROWO

VO-Paris Euro3D-VO Client

Location of the Euro3D FITS (URL or File):  Load File Automatically

<http://alcor.sao.ru/php/cgi-bin/mpfs2e3d.cgi?in=mpfs%2FFabrika%2>

0 50 100 150 200

SPEC\_ID: 149 GROUP\_No: 1

sp00149

Euro3D-VO (c)2007 VO-Paris

---

Search Results - Mozilla Firefox

http://alcor.sao.ru/php/search?axis1.ucd=pos&axis2.ucd=time&axis3.ucd=em&axi

## ASPID-SR Search Interface

Search | About | Authors Start VO Tools

### Search Results

[return back to form](#)

Proposal Title	Target Name	J2000 Coordinates	Local Date & Time	Exp. Time	Instrument Name	Observational Mode	CharDM XML	Cube	E3D
BL Lac 0716+714	AMIR 0716	(07h 21m 57.16s, +71d 20m 25.4s)	1999-11-13 22:28:17	3600	MPFS	1X(16*15*1034)	<a href="#">XML</a>	<a href="#">Cube</a>	<a href="#">E3D</a>
Spectroscopy LBV	CICAM	(20h 43m 50.45s, -22d 04m 06.2s)	2000-03-15 22:14:55	1800	MPFS	1X(16*15*1034)	<a href="#">XML</a>	<a href="#">Cube</a>	<a href="#">E3D</a>
LBV Spectroscopy	HOLMBERG2	(08h 19m 32.40s, +70d 42m 33.3s)	2002-03-16 00:08:00	1800	MPFS	1X(16*15*1034)	<a href="#">XML</a>	<a href="#">Cube</a>	<a href="#">E3D</a>
LBV Spectroscopy	HOLMBERG2	(08h 19m 30.67s, +70d 42m 39.0s)	2002-03-16 01:39:41	3600	MPFS	1X(16*15*1034)	<a href="#">XML</a>	<a href="#">Cube</a>	<a href="#">E3D</a>
unknown	W532	(01h 35m 11.95s, +30d 42m 05.2s)	1998-09-18 21:56:51	2400	MPFS	10X(15*16*1034)	<a href="#">XML</a>	<a href="#">Cube</a>	<a href="#">E3D</a>
Spectra GRB	GRB020813	(19h 46m 50.52s, -18d 25m 23.03s)	2000-08-13 23:03:17	5400	MPFS	1X(16*15*1034)	<a href="#">XML</a>	<a href="#">Cube</a>	<a href="#">E3D</a>

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Aladin V4.0 BETA VERSION (based on V4.007)

Load... Save... Tools... Plugins... Print... Help... Quit

Position: ICRS [20:43:42.17 -22:04:34.2] Pixel: full unknown

AAO.R.DSS2.597

select pan zoom draw tag text filter rgb assoc samp cont

PLASTIC-1 AAO.R.DSS2 ESO DSS2-re

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VOSpec

Unit Log So... Target Ra Dec Size 0.1 Go

VOSpec Spectra Viewer

Flux (J/Logarithmic) x10<sup>-1</sup>

Wavelength (micron, logarithmic) x10<sup>-1</sup>

4.50 5.00 5.50 6.00 6.50 7.00

5.0 6.0 1e01 5.0 1e00 5.0 1e-01 5.0 1e-02 5.0

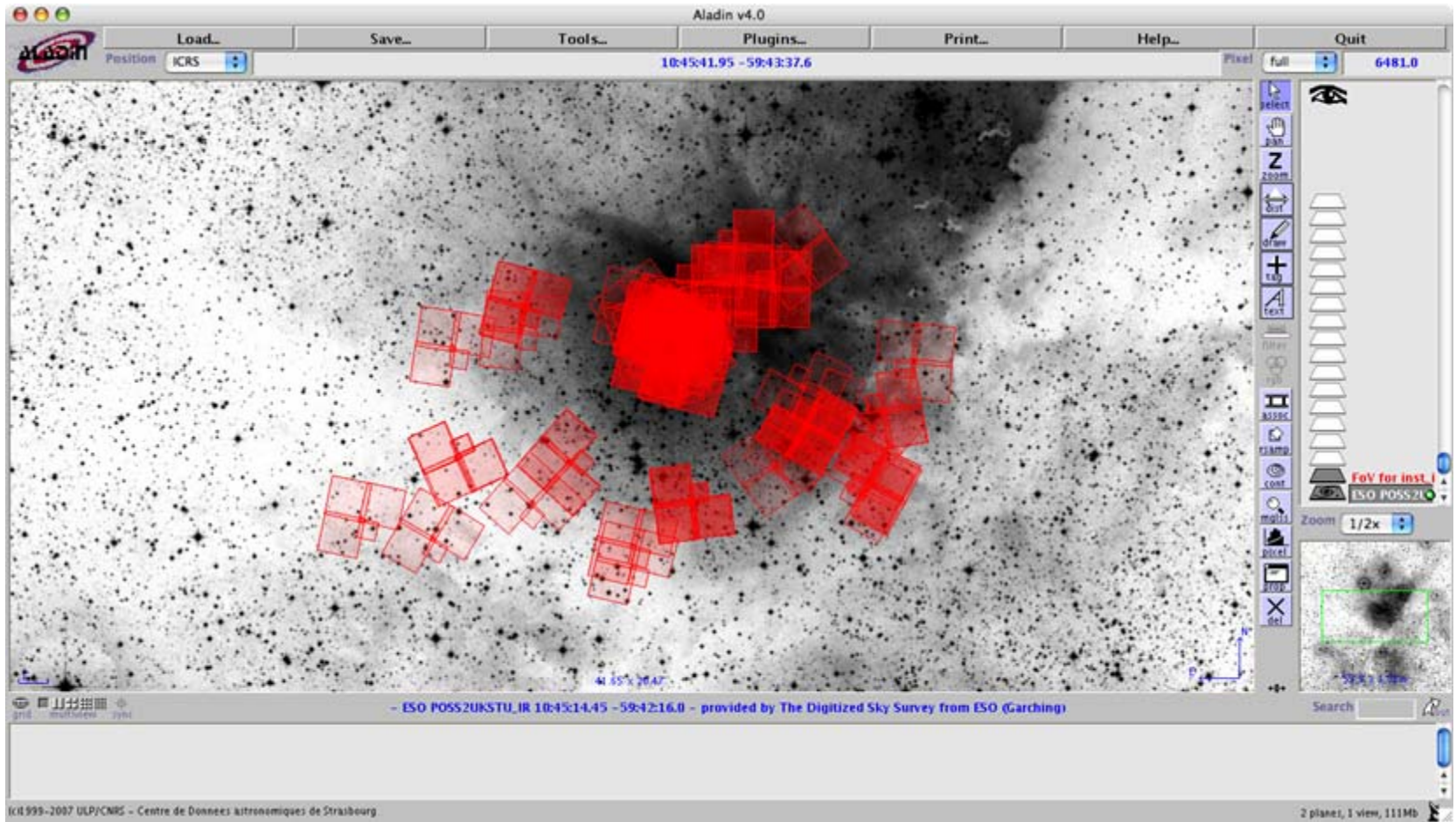
demarrer alinda.u-strasbg.fr ASPID-SR Search Int... http://alcor.sao.ru... Téléchargements Console Java 7 Java(TM) 2 Platfo... Observatoire Astrono... FR 11:24

(I. Chiligarian)

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Toutes les observations de la WFPC2 (HST) dans un champ donné  
(T. Boch)



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# Aladin très grandes images

Plusieurs milliards de pixels avec une machine de quelques Mbytes de RAM

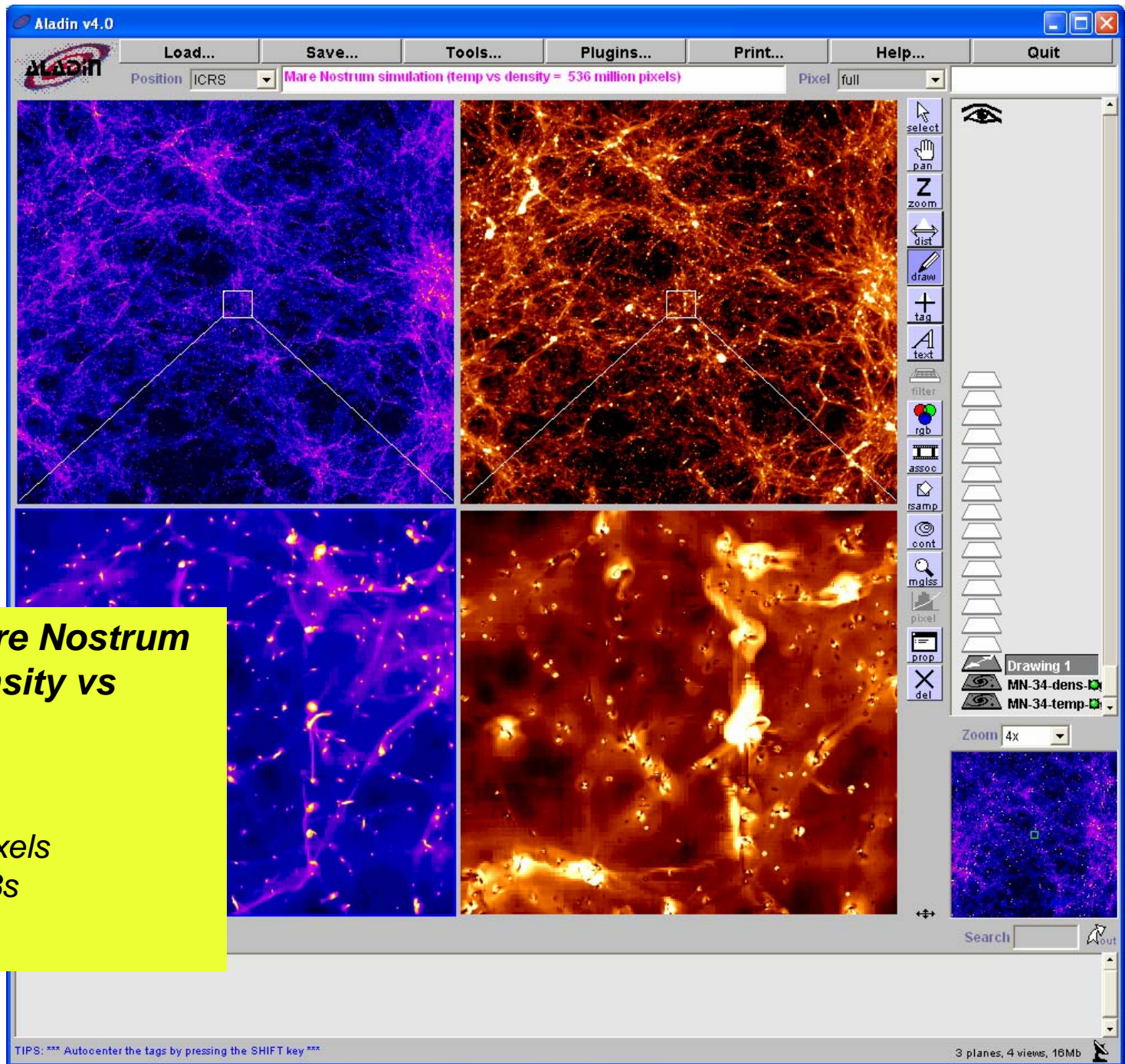
(tests jusqu'à 16Gb)  
(P. Fernique)

## Simulation Mare Nostrum C. Pichon (density vs temp)

2 images de 1Go

⇒ 536 millions pixels scannés en 58s

⇒ 32 Mb RAM



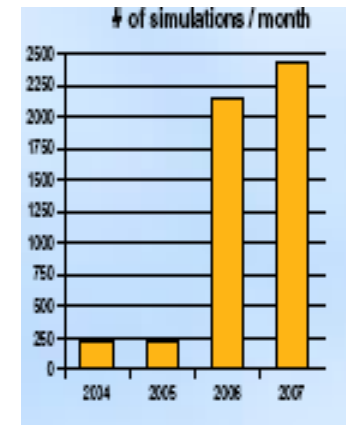


## Besançon Model of the Galaxy: what for ?

- Test formation scenarios of the Galaxy, stellar models, Galactic dynamics
- Produce realistic simulations of the stars in the Galaxy to be compared with observations
- to estimate field star contamination around galactic clusters, in front of resolved galaxies, etc... to help for the interpretation of observed data
- Produce simulations to prepare observations and test their objectives:
  - Limiting magnitude, required precision, choice of filters...

"asynchronous" operation mode: *ftp* of result when simulation is completed

(B. Debray)



## Model of the Galaxy: new requirements

- Since the commissioning of the 2003 version, the number of "big" (size > 100 Mbytes) catalogues of simulated stars has increased
  - Regularly, simulations with sizes above 1 Gbyte (... up to 19 Gbytes)
  - Several requests to use the model as a "web service" for 2 years:
    - Photometric calibration of optical/near IR of GRBs (*J.Greiner, MPE*)
    - Star counts for Large Zenith Telescope (*T. Pfrommer, Univ. British Columbia*)
    - Counts to look for calibrators for interferometry (*JMMC*)
    - Comparaison with counts provided by GALEX (*OAMP-LAM*)
- ⇒ **new "HTTP web service mode" for "short" simulations**



# Workflows and simulation codes

Example : FUSE observations of diffuse line of sights

## 1 - PDR code

- modelisation of diffuse clouds
- gives theoretical absorption spectra

## 2 - Stellar spectra databases

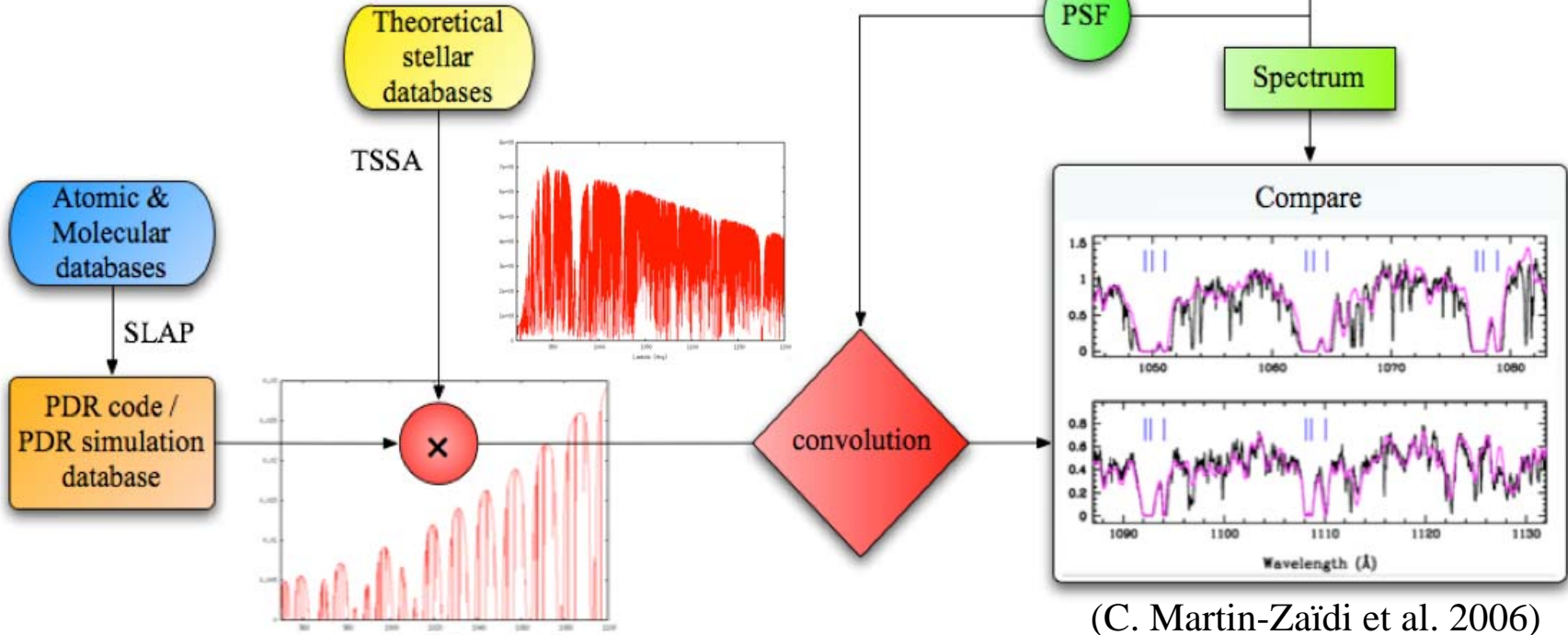
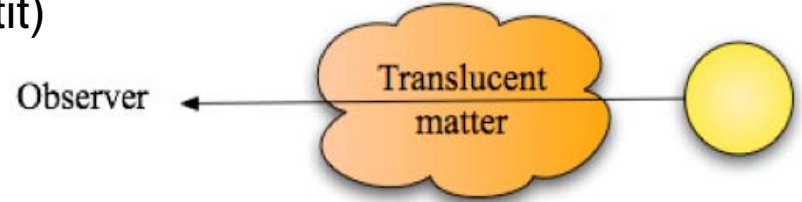
- provides synthetic stellar spectra

## 3 - FUSE database

- provides observations & PSF

## 4 - Compare directly models to observations

(F. Le Petit)

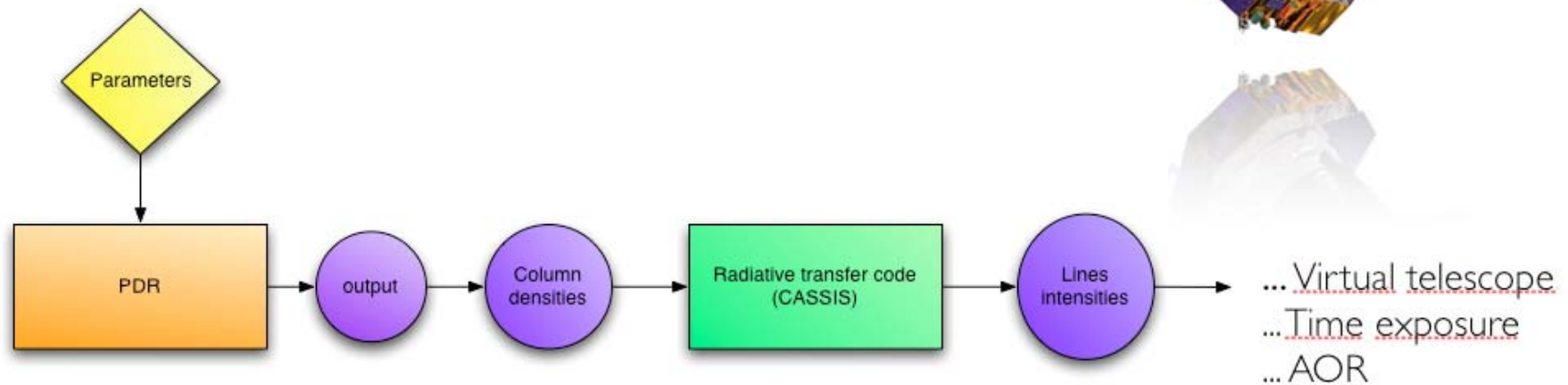
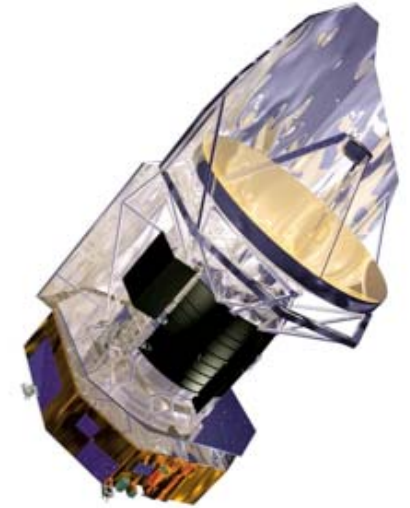


(C. Martin-Zaïdi et al. 2006)

Example : Préparation Herschel

Estimation des temps de pause

1. Modélisation de la structure d'un nuage avec le code PDR
2. Injecte colonnes de densité dans un code de transfert
3. Estimation du temps de pause



Radial velocities were determined through cross-correlation with an array of template spectra representing an emission-line galaxy, a quasar, and nine different types of stars (having spectral types from A3 V to M5 V to provide a match to both stars and early-type galaxies). This was done within the RVSAO IRAF package (Kurtz & Mink 1998). The template giving the highest  $R$ -coefficient (Tonry & Davis 1979) provides the adopted radial velocity for an observed spectrum, as well as a simple indication of the type of spectrum. Further details of the observing and reduction were given in Drinkwater et al. (2000b) and Deady et al. (2002).

When a target has been observed more than once, which does sometimes occur because of fiber positioning practicalities, the result having the highest  $R$ -coefficient is adopted. Only results having  $R \geq 3.0$  are considered reliable.

#### 2.4. Discovery of Ultracompact Dwarfs in Virgo

A total of 1633 spectra were obtained of 1501 individual targets. Of these, 1322 had reliable ( $R \geq 3.0$ ) velocity results. These results were obtained for 60% of objects satisfying the object type, magnitude, and color constraints over the whole 2dF field and for 70% within  $0.65$  of M87. Figure 3 presents the histogram of heliocentric radial velocities for objects in the range  $-500$  to  $2200 \text{ km s}^{-1}$ . The distribution is dominated by Galactic stars between  $-200$  and  $400 \text{ km s}^{-1}$ . Ten objects have radial velocities between  $400$  and  $2100 \text{ km s}^{-1}$ . One of these (at R.A. =  $12^{\text{h}}31^{\text{m}}54^{\text{s}}.84$ , decl. =  $+11^{\circ}56'59''.6$  [J2000.0]) gave a velocity of  $527 \pm 121 \text{ km s}^{-1}$ , and its strongest cross-correlation result is

vey area have radial velocities  $<400 \text{ km s}^{-1}$ ; some even have negative radial velocities. Thus, a consequence of applying a low-velocity cutoff to avoid Galactic star contamination in the compact object sample is that the survey may miss UCDs with radial velocities below  $400 \text{ km s}^{-1}$ . We estimate that there may be  $1 \pm 1$  additional UCDs among the objects observed that have been lost by applying this cutoff (assessed by applying this cutoff to the distribution of observed UCD velocities). But UCDs with  $cz < 400 \text{ km s}^{-1}$  will be very difficult to distinguish from Galactic stars, especially with poorly flux calibrated fiber spectra, so obtaining a dynamically complete sample of Virgo UCDs will prove difficult with the currently available observing resources.

We identify as UCDs the remaining nine objects with velocities consistent with Virgo Cluster membership. Like those in Fornax, all nine Virgo UCDs have early-type galaxy spectra. Most were fitted best by stellar templates of K- or M-type solar-composition stars, consistent with old, moderately metal-rich stellar populations. The spectrum of Virgo UCD 4, however, shows a bluer continuum (Fig. 4), and the best-fitting template is that of a G0-type star, which can be explained by stellar populations that are younger or more metal-poor than the other UCDs. The objects are listed in Table 2.

A check of positions confirmed that none coincided with any known cluster galaxies in the Virgo Cluster Catalog (Binggeli et al. 1985), although UCD 3 lies close to M87. None of the UCDs match the objects described by Hasegan et al. (2005), who studied specific fields within the Virgo Cluster. While there are Hasegan et al. objects within our 2dF field, all their confirmed Virgo Cluster compact objects are located within  $6'$  of M87,

(C. Bonnin)





Nomenclature of Celestial Objects (full) - Mozilla Firefox

Echier Edition Affichage Aller à Marque-pages Outils ?

http://vizier.u-strasbg.fr/viz-bin/Dic?/9161688

Windows era\_gp\_final\_en.pdf ... Mail :: Bienvenue sur ... CDS . Main . WebHome EP55 FP7: Login SF2A : annuaire

 **Dictionary of Nomenclature of Celestial Objects** 

[CDS](#) · [Simbad](#) · [VizieR](#) · [Aladin](#) · [Catalogues](#) · [Nomenclature](#) · [Biblio](#) · [Tutorial](#) · [Developer's corner](#)

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Details on Acronym: UCD

UCD (Ultra-Compact Dwarf)

**Write:** <<[JDJ2006] N>>

**Object:** G in ClG ([SIMBAD class](#): GinCl = Galaxy in Cluster of Galaxies)

**in source:** [Virgo Cluster](#)

**Ref:** =2006AJ...131..312J

by JONES J.B. , DRINKWATER M.J., JUREK R. , PHILLIPPS S., GREGG M.D., BEKKI K., COUCH W.J., KARICK A., PARKER Q.A., SMITH R.M.

Astron. J., 131, 312-324 (2006)


*Discovery of ultracompact dwarf galaxies in the Virgo cluster.*

- Table 2: <[JDJ2006] N> (Nos 1-9) = <VCO JHHMMSS.s+DDMMSS> N=9.

\*\*\*\*\* Avoid the usage of UCD, prefer [\[JDJ2006\]](#)

**Origin** of the Acronym: A = *Assigned by the author(s)*

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Terminé

Nomenclature of Celestial Objects (full) - Mozilla Firefox

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http://vizier.u-strasbg.fr/viz-bin/Dic?/9162254

Windows era\_gp\_final\_en.pdf ... Mail :: Bienvenue sur ... CDS . Main . WebHome EP55 FP7: Login SF2A : annuaire

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Details on Acronym: UCD

UCD (Ultra-Compact Dwarf)

**Write:** <<[PDG2001] (UCD) N>>

**Object:** G in ClG ([SIMBAD class](#): GinCl = Galaxy in Cluster of Galaxies)

**in source:** [Fornax Cluster](#)

Stat: is *completely incorporated in Simbad*

**Ref:** =2001ApJ...560..201P

by PHILLIPPS S. , DRINKWATER M.J., GREGG M.D., JONES J.B.

Astrophys. J., 560, 201-206 (2001)


*Ultracompact dwarf galaxies in the Fornax cluster.*

- Table 1: <[PDG2001] UCD N> (Nos 1-5).

\*\*\*\*\* Avoid the usage of UCD, prefer [\[PDG2001\]](#)

**Origin** of the Acronym: A = *Assigned by the author(s)*

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Terminé



# Résultats

- Correction et amélioration du Dictionnaire de Nomenclature
- Concentration du travail sur la valeur ajoutée
  - Traitement plus rapide des documents
  - Vérification des données saisies
- Collecte d'information supplémentaires
  - Nom dans l'article
  - Position, nombre d'occurrences: *poids*

Enfin un moyen de sélectionner les références



# AMDA (Automated Multiple Dataset Analysis)

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

Systeme integré permettant d'exploiter en ligne et de façon transparente des données multi-jeux et des tables d'événements.

Fonctionnalités:

- %Accès automatisé aux données locales ou distantes
- %Calculs de paramètres édités par l'utilisateur
- %Visualisation. Edition de figures génériques
- %Recherche conditionnelle d'événements automatisée selon des critères éditables
- %Recherche semi-automatisée d'événements (sélection visuelle)

Tables  
d'événements

- Exploitation de vastes bases de données
- Echange entre bases de données et serveurs
- Recherche, caractérisation, classification d'événements
- Construction de catalogues
- Etudes statistiques, systématiques, historiques
- Constellations virtuelles

(C. Jacquey)



Welcome to AMDA - Mozilla Firefox

Fichier Edition Affichage Aller à Marque-pages Outils ?

My Workspace Plot Data Download Data **Conditional Search** Web Services Help Data Inventory Graph Feedback

### Select parameters to compose the condition

open all | close all

- Missions
  - CLUSTER1
  - CLUSTER2
  - CLUSTER3
  - CLUSTER4
  - CLUSTER-SP
    - orbit
      - x
      - y
      - z
      - r
    - fgm
    - cis-hia
      - dens
      - vx\_gse
      - vy\_gse
      - vz\_gse
      - lv
      - t
    - cis-codif
    - ACE
    - GEOTAIL
      - orbit
        - x
        - y
        - z
        - r
      - mgf\_prelim

### Construct Your Search Condition:

```
xyz_c3(0)<5 & xyz_g(0)<5 &
abs(xyz_c3(1)-xyz_g(1))<5 &
hia_sp(1)*lep_g(1)<0
```

### Syntax of Condition expression

arithmetic operators: + - \* / ^  
brackets: ( ) , [ ]  
functions: **sin() cos() sqrt() atan() abs()**  
relational operators: > , <  
logical operators: & , |

### Example

**sin(param1) > 0 & param2 < 0**

### Averaging/Interpolation

Sampling time step  
600 secs

### Treat data absence as gap

Time interval greater than  
5 × data sampling time

### Start Time

Year / Mon / Day Hour : Min : Sec  
2002 / 08 / 01 00 : 00 : 00

### Time Interval

Day / Hour : Min : Sec  
120 / 00 : 00 : 00

Reset

Generate Table To... tbGT\_CL\_revFlow02 Save Condition To... GT\_CL\_revFlow02

Generate Table From ... toto1 Load Condition From... GT\_IT\_revFlow95

To new Time Table ... NewSearchTable

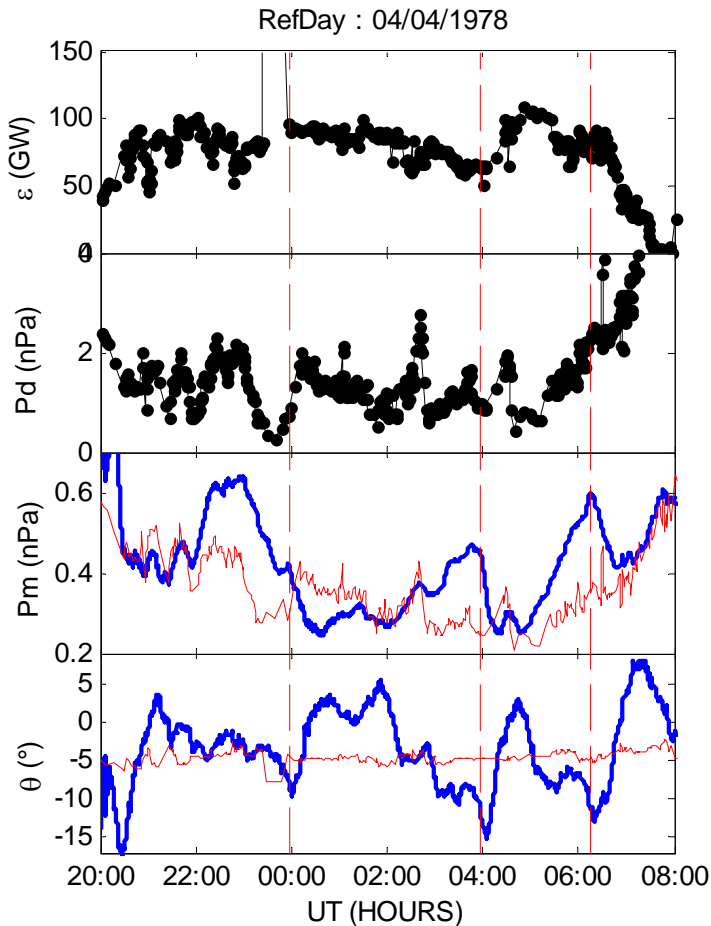
Terminé

Démarrer [Icons] 10:14





# Exemple d'utilisation d'AMDA: Préparation de l'instabilité responsable des sous-orages

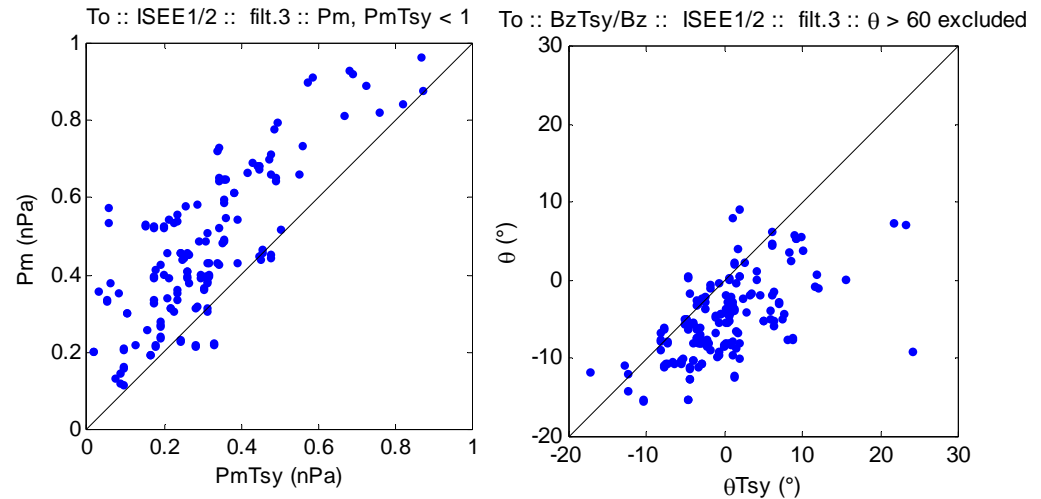


Jacquey et Sauvaud, 1994

Jacquey, 1996



Quelle est la configuration magnétique de la queue associée au déclenchement de l'instabilité?



%La densité d'énergie est systématiquement sous-estimée par le modèle de Tsyganenko

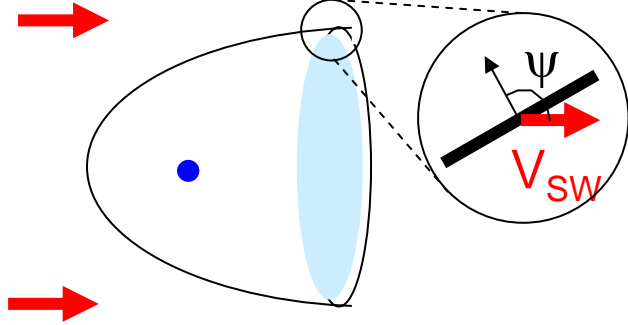
%La configuration magnétique de la queue est systématiquement plus "étirée"

Jacquey et al., 2006

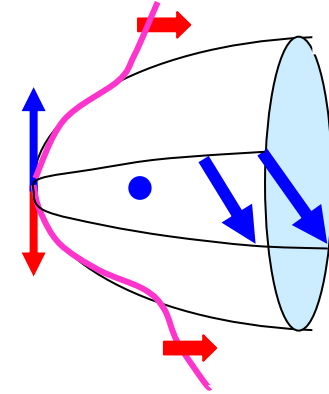


# Préparation de l'instabilité responsable des sous-orages (2)

Equilibre de pression à la magnétopause



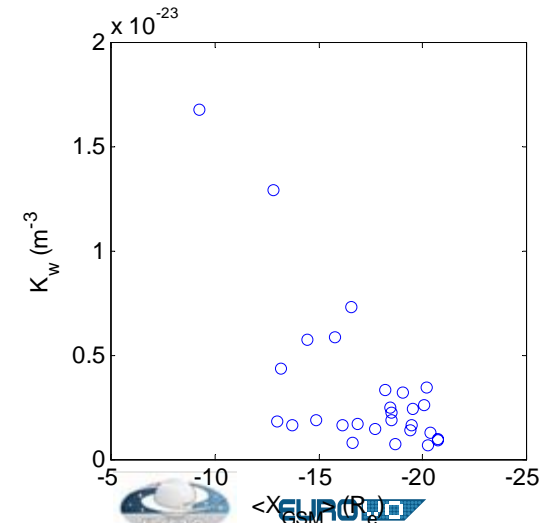
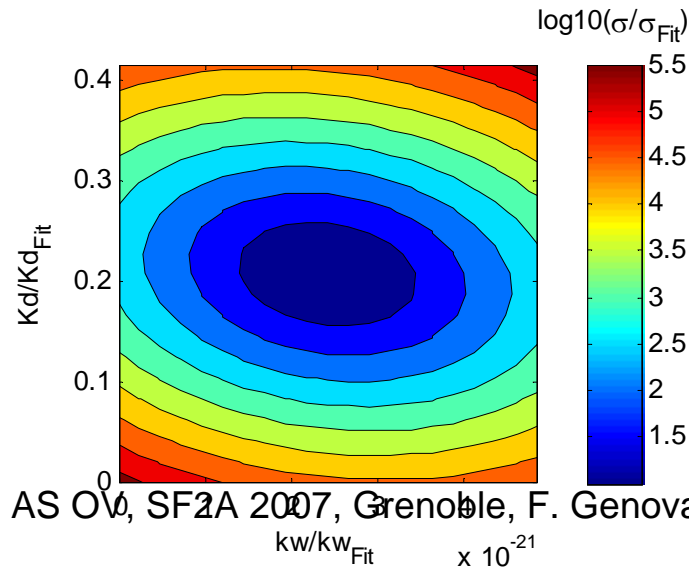
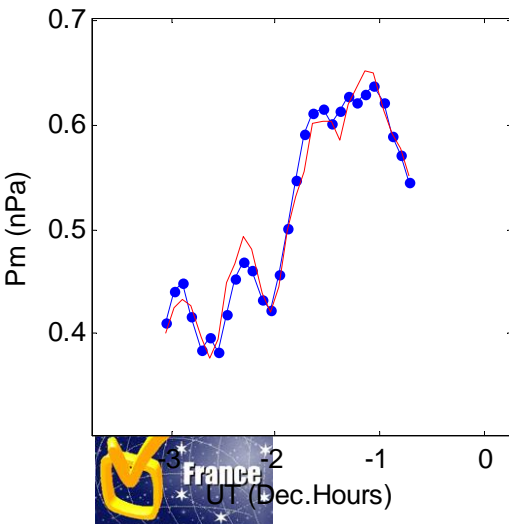
Couplage électromagnétique entre le Vent solaire et la magnétopause



Modèle:

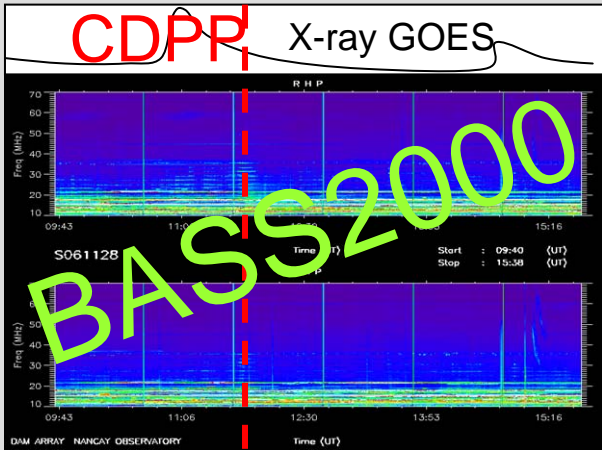
$$P_{m,Loc}(t) = \frac{1}{2} \left\{ P_{mo} + K_W \cdot \int_{t_0}^t \varepsilon \cdot dt + K_d \cdot P_{d,SW}(t + \Delta t) \right\}$$

$P_{mo} = 0.49389$  <>  $kw = 2.4194e-021$   
 $K_d = 0.20697$  <>  $\sigma = 0.0029251$



AS OV, SF2A 2007, Grenoble, F. Genova

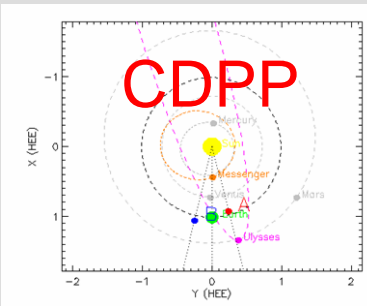
# General functions



SOL/tools

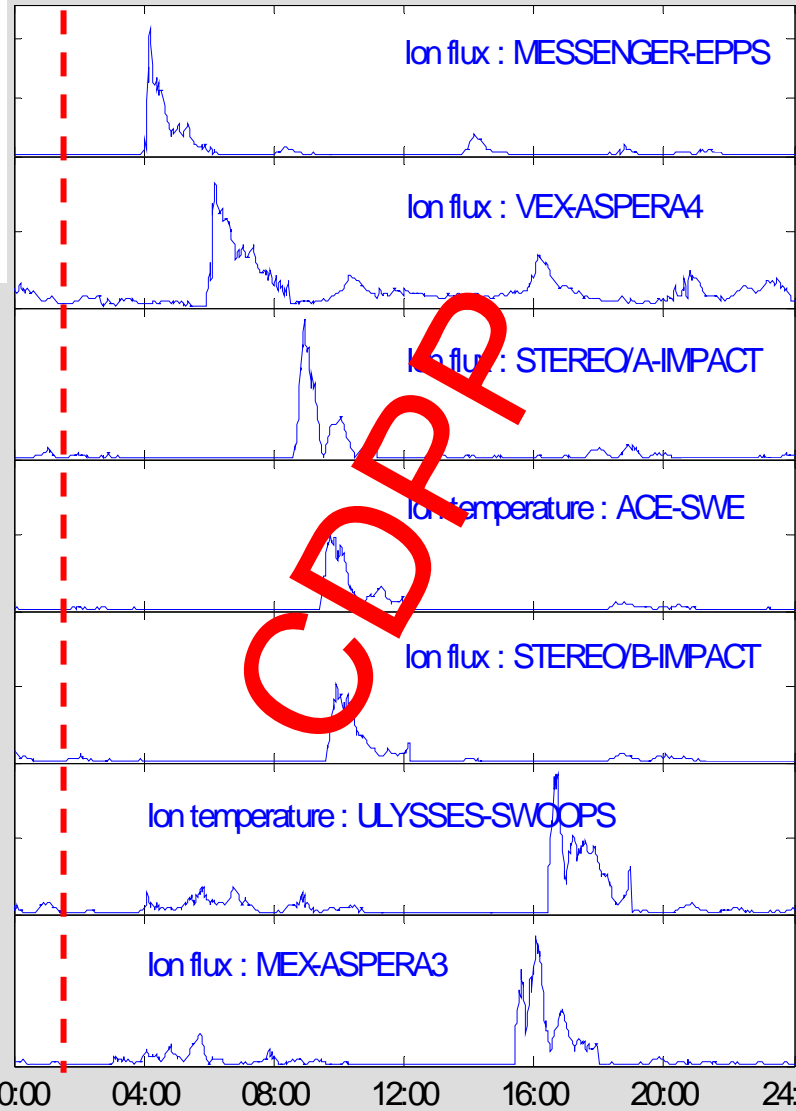


PLAS  
tools



Time  
tools

PLAS  
tools



SOL/Workspace/Composer

PLAS/Workspace/Composer