GAIA and the Virtual Observatory

Enrique Solano, CAB (INTA-CSIC)
Spanish VO Principal Investigator

The VO group

Grupos/líneas REG

(decisión tomada en el kick-off)

- Líneas de investigación
- Estrellas Masivas y distancias exactas a Cúmulos Masivos (Jesús Maíz-Apellániz)
- Gould Belt (Núria Huélamo)
- Cúmulos estelares y asociaciones (Emilio Alfaro)
- Evolución estelar (tardía) (Ana Ulla)
- Estructura de las Estrellas, Comparación con Modelos (Carme Jordi)
- Historia de la formación estelar en el Grupo Local (Antonio Aparicio)
- Estrellas de baja masa, enanas marrones y exoplanetas (José A. Caballero)
- Estructura a gran escala (Antonio Luís Cabrera-Lavers)
- Instrumentación (Jordi Torra, Paco Garzón)
- Sistema solar (Rene Duffard)

Servicios/ herramientas

- Observatorio Virtual (Enrique Solano)
- Minería de datos y astroestadística (Luis Sarro)

GAIA in context

- Goal: ensure the optimum scientific exploitation of GAIA data.
  - Easy and efficient data interchange with other astronomical resources.
    - Virtual Observatory: a key element.

GAIA Interoperability requirements:

Eas ata)

RA	DE
75.614319	7.46102

Photon

Source
Strömgren (II/215)
Strömgren (II/215)
Strömgren (II/215)
Strömgren (II/215)
2MASS (II/246)
2MASS (II/246)
2MASS (II/246)
IRAS/PSC (II/125)
IRAS/PSC (II/125)
IRAS/PSC (II/125)
IRAS/PSC (II/125)
IRAS/FSC (II/156A)
IRAS/FSC (II/156A)
IRAS/FSC (II/156A)
IRAS/FSC (II/156A)
Tycho-2 (I/259/tyc2
Tycho-2 (I/259/tyc2
Spitzer/FEPS
Spitzer/FEPS
Spitzer/FEPS
Spitzer/FEPS
Spitzer/FEPS

Sptype

Catalog Name	Catalog Code	Sptype	Sptype error	NomCol	Units	UCD
Dieckvoss, Heckmann 1975	I/61B	A5		Sp		src.spType
SAO Staff 1966; USNO, ADC 1990	I/131A	A0		SpType		src.spType
Yale Univ 1939-1983; ADC 1989	I/141	A0		Sp		src.spType
Roeser+, 1988	I/146	A5		Sp		src.spType
ACRS	I/171			SpType		src.spType
Bucciarelli+ 1992	I/176	A5		Sp		src.spType
ESA 1997	I/239	A0		SpType		src.spType
TD1	II/59B	A0		SpType		src.spType
Fabricius+, 2002	IV/25	A0		SpType		src.spType
Egan+ 1996	V/98	A5		Sp		src.spType
Myers+ 2002	V/109	A0		Sp		src.spType

Date	Note
999-12-26	
999-12-26	
999-12-26	

Age

Catalog Name	Catalog Code	Age	Age error	NomCol	Units	UCD
No results						

Space Velocity

Catalog Name	Catalog Code	SpaceV	SpaceV error	NomCol	Units	UCD
No results						

Proper Motion

Catalog Name	Catalog Code	ProperM	ProperM error	NomCol	Units	UCD
ESA 1997	I/239	-23.32	0.69	pmDE	mas/yr	pos.pm;pos.eq.dec
ESA 1997	I/239	6.67	1.11	pmRA	mas/yr	pos.pm;pos.eq.ra

MIPS 24 236750

Efficient management of preparatory information

- Preparatory observations from Calar Alto (D. Barrado).
- New catalogues (I. Negueruela)

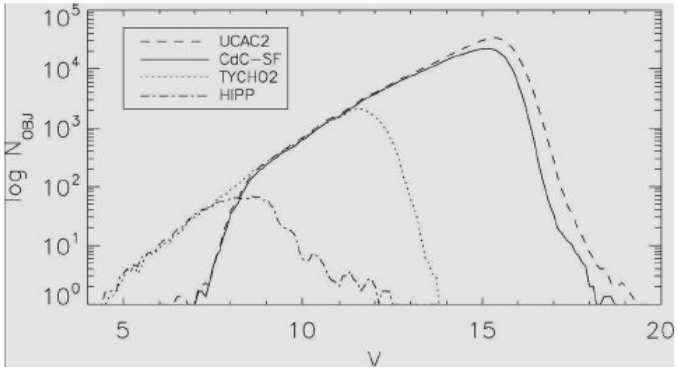
GAIA Interoperability requirements:

Easy comparison with selected archives

- Proper motions:

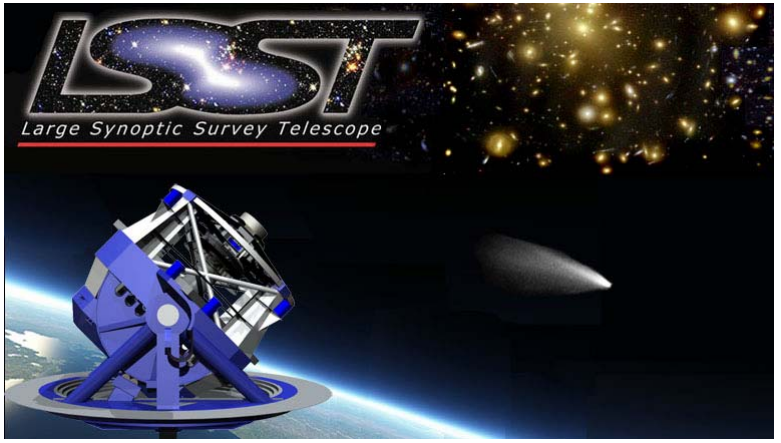
CdC-SF Catalogue:

- Mean Epoch 1901.4, ICRS
- Sky area ~1080 degrees^2
- Positional Range $06^h \leq \alpha \leq 14^h$, $-10.5^\circ \leq \delta \leq -2.5^\circ$
- Magnitude range $6 \leq V \leq 16.3$ (completeness)

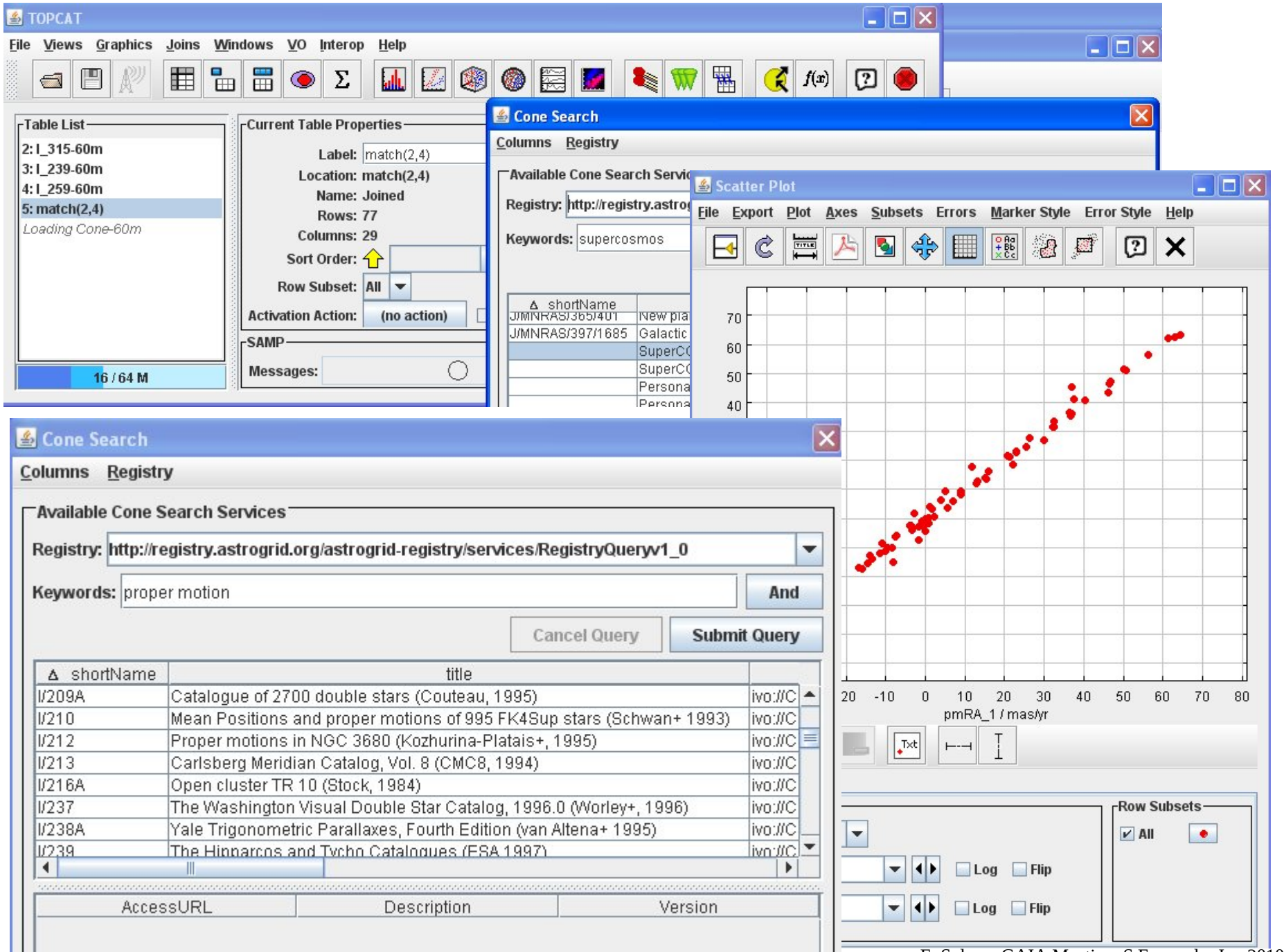


Vicente, Heidelberg, Sep'09

- Hipparcos
- Tycho-2
- UCAC-3
- SuperCosmos

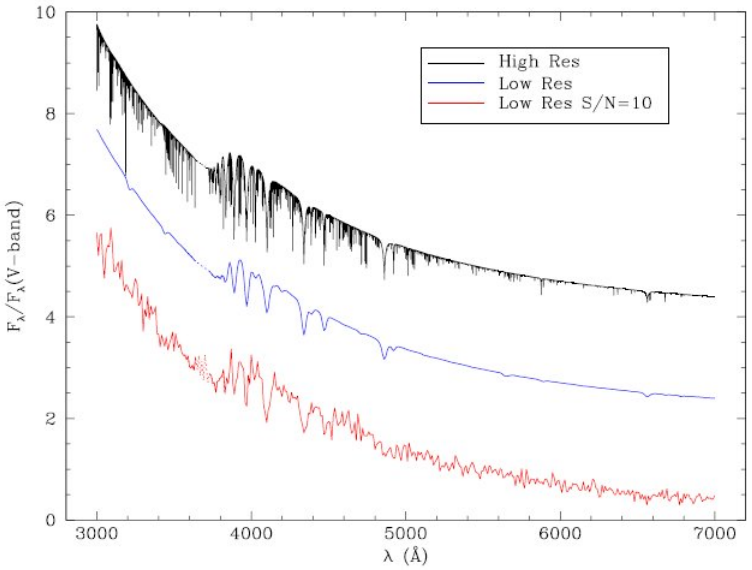


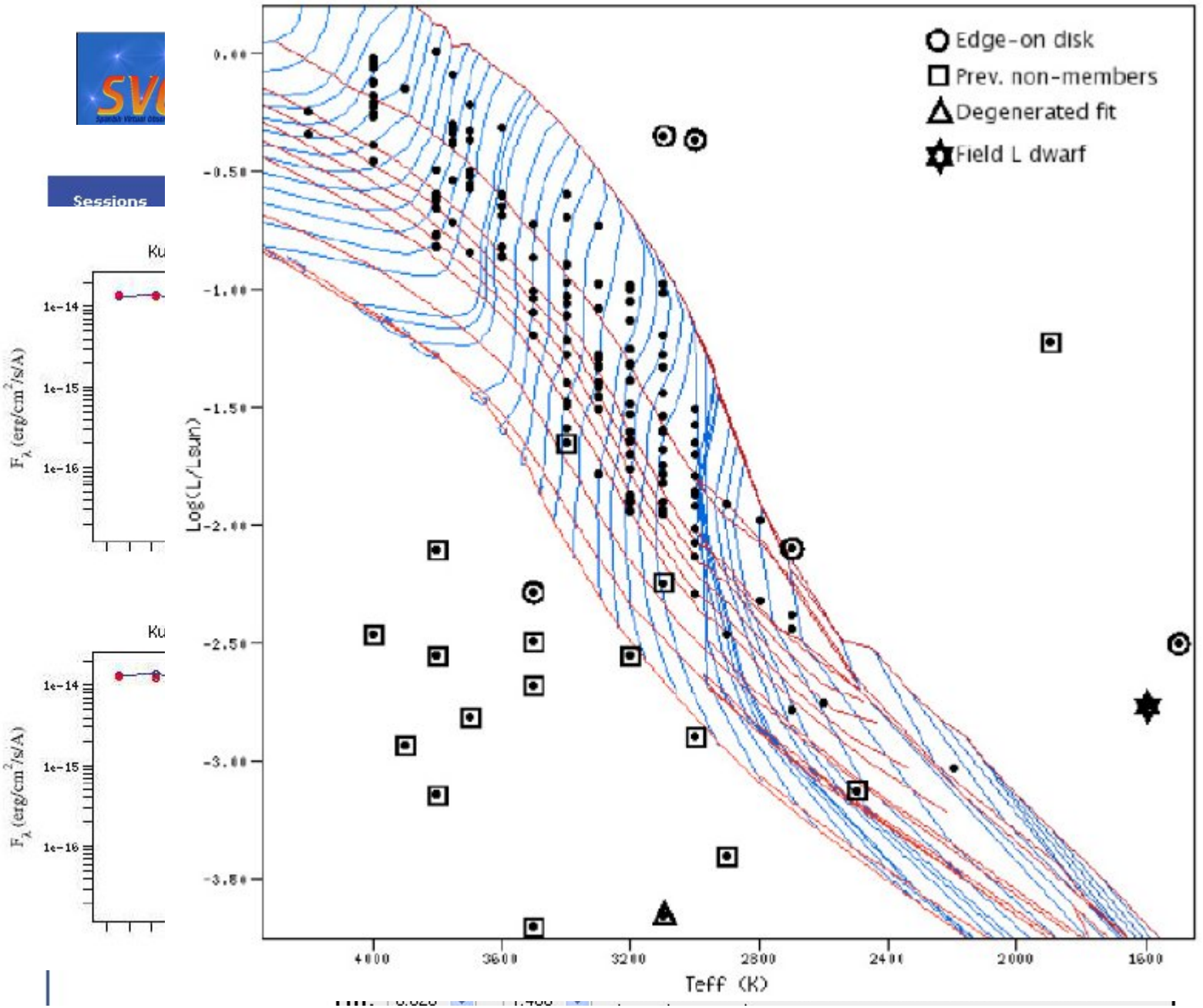
E. Solano. GAIA Meeting, S.Fernando, Jun 2010


TOPCAT
File Views Graphics Joins Windows VO Interop Help
Table List
2: I_315-60m
3: I_239-60m
4: I_259-60m
5: match(2,4)
Loading Cone-60m
16 / 64 M
Current Table Properties
Label: match(2,4)
Location: match(2,4)
Name: Joined
Rows: 77
Columns: 29
Sort Order:
Row Subset: All
Activation Action: (no action)
SAMP
Messages:
Cone Search
Columns Registry
Available Cone Search Servic
Registry: http://registry.astrog
Keywords: supercosmos
shortName
J/MNRAS/365/401 New pla
J/MNRAS/397/1685 Galactic
SuperC
SuperC
Persona
Persona
Scatter Plot
File Export Plot Axes Subsets Errors Marker Style Error Style Help
70
60
50
40
20 -10 0 10 20 30 40 50 60 70 80
pmRA_1 / mas/yr
Txt
Row Subsets
All
Log Flip
Log Flip
Cone Search
Columns Registry
Available Cone Search Services
Registry: http://registry.astrogrid.org/astrogrid-registry/services/RegistryQueryv1_0
Keywords: proper motion
And
Cancel Query
Submit Query
shortName
title
I/209A Catalogue of 2700 double stars (Couteau, 1995) ivo://C
I/210 Mean Positions and proper motions of 995 FK4Sup stars (Schwan+ 1993) ivo://C
I/212 Proper motions in NGC 3680 (Kozhurina-Platais+, 1995) ivo://C
I/213 Carlsberg Meridian Catalog, Vol. 8 (CMC8, 1994) ivo://C
I/216A Open cluster TR 10 (Stock, 1984) ivo://C
I/237 The Washington Visual Double Star Catalog, 1996.0 (Worley+, 1996) ivo://C
I/238A Yale Trigonometric Parallaxes, Fourth Edition (van Altena+ 1995) ivo://C
I/239 The Hipparcos and Tycho Catalogues (ESA 1997) ivo://C
AccessURL
Description
Version

GAIA Interoperability requirements: Easy access to theoretical data

- BAseL (E. Alfaro).
- Hot subdwarfs (A. Ulla)
- Ultracools (R. Carballo)




Edge-on disk
Prev. non-members
Degenerated fit
Field L dwarf
Log(L/Lsun)
Teff (K)
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
4000
3600
3200
2800
2400
2000
1600

Convection Rotation and planetary Transits

2006©MJM | 2007-03-06

Welcome

Meetings

Links

Contacts

Numerical tools

Reference grids

Models

Frequencies

The space experiment **CoRoT** is a French mission for the:

- **detection and study of stellar oscillations** (asteroseismology),
- the **search for extra-solar planets**,
- and many **additional programs**.

This website provides information on the

Evolution and Seismic Tools Activity (ESTA)

taking place within the **Seismology Working Group**. The tasks being developed by the **participants** in this activity, in order to prepare and explore the scientific results of CoRoT, are:

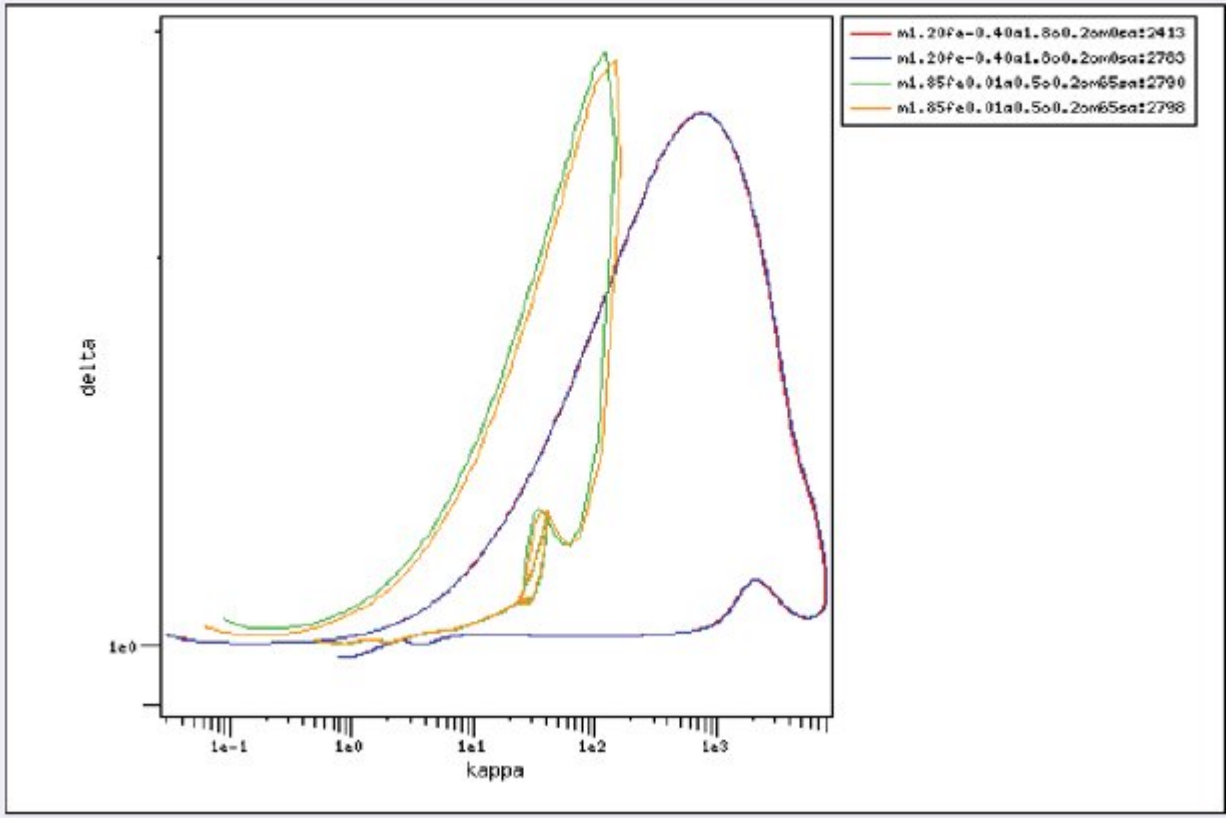
- **to provide** a grid of **reference stellar models** and their frequencies of oscillation,
- to extensively **test, compare and optimise numerical tools** used to calculate:
  - **stellar models**,
  - **oscillation frequencies**,
  - and seismic inversions.

These pages are under development as the activities progress. The **latest changes** are:

- [2008-05-01] **ApSS Volume** - table of contents of the CoRoT/ESTA Journal volume.
- [2008-05-01] **Meeting 8** - Evolution and Pulsation of Massive Stars, **7-11 July 2008**.
- [2008-02-01] **Grids of models and frequencies** - added new grids and updated of the links to existing grids.

VOTA: VO Tool for Asteroseismology

Plot files



VO Science.

The SVO role in the Consolider-GTC project. Similarities and potential collaborations in the REG

F. Jiménez-Esteban, E. Solano, M. Arevalo, C. Rodrigo

Spanish Virtual Observatory
Centro de Astrobiología (INTA-CSIC), PO Box 78, E-28691 Vva de la Cañada, Madrid.

Abstract

The Spanish Virtual Observatory (SVO) participation in large scientific consortia is characterized by its intrinsically multidisciplinary nature. In these frameworks SVO collaborates with the research groups providing scientific and technical support in VO-related matters. A good example of this kind of collaboration is the SVO participation in the Consolider-GTC project. In this poster, as examples of our lines of work, we describe different types of collaborations that can help REG members to identify potential synergies with their research projects.

- Provide information and support about the existing tools to tackle the scientific problem
- If necessary, develop new analysis tools.

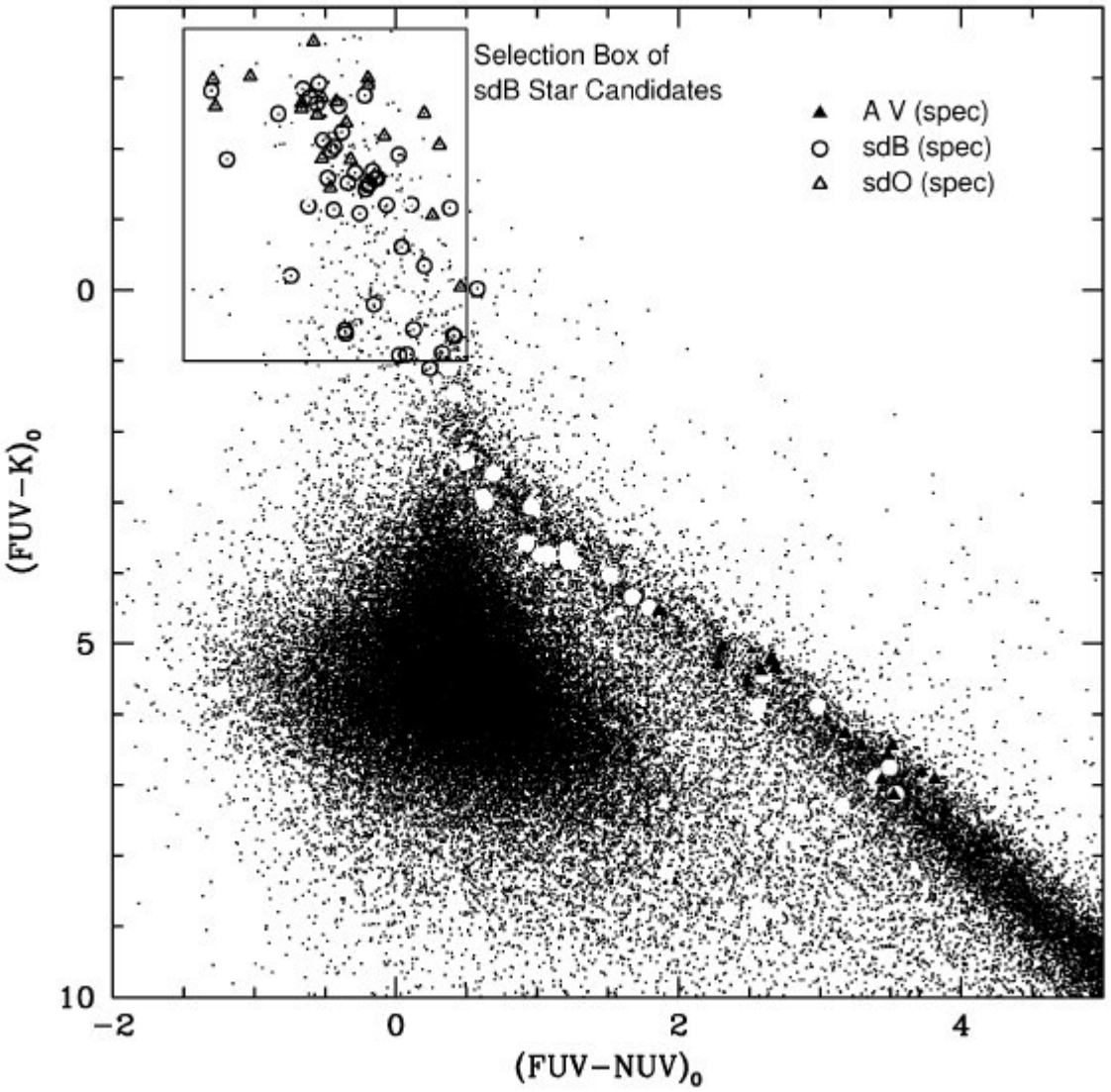
Example of VO science case

Title:] mining

astronor

Team: I Enrique

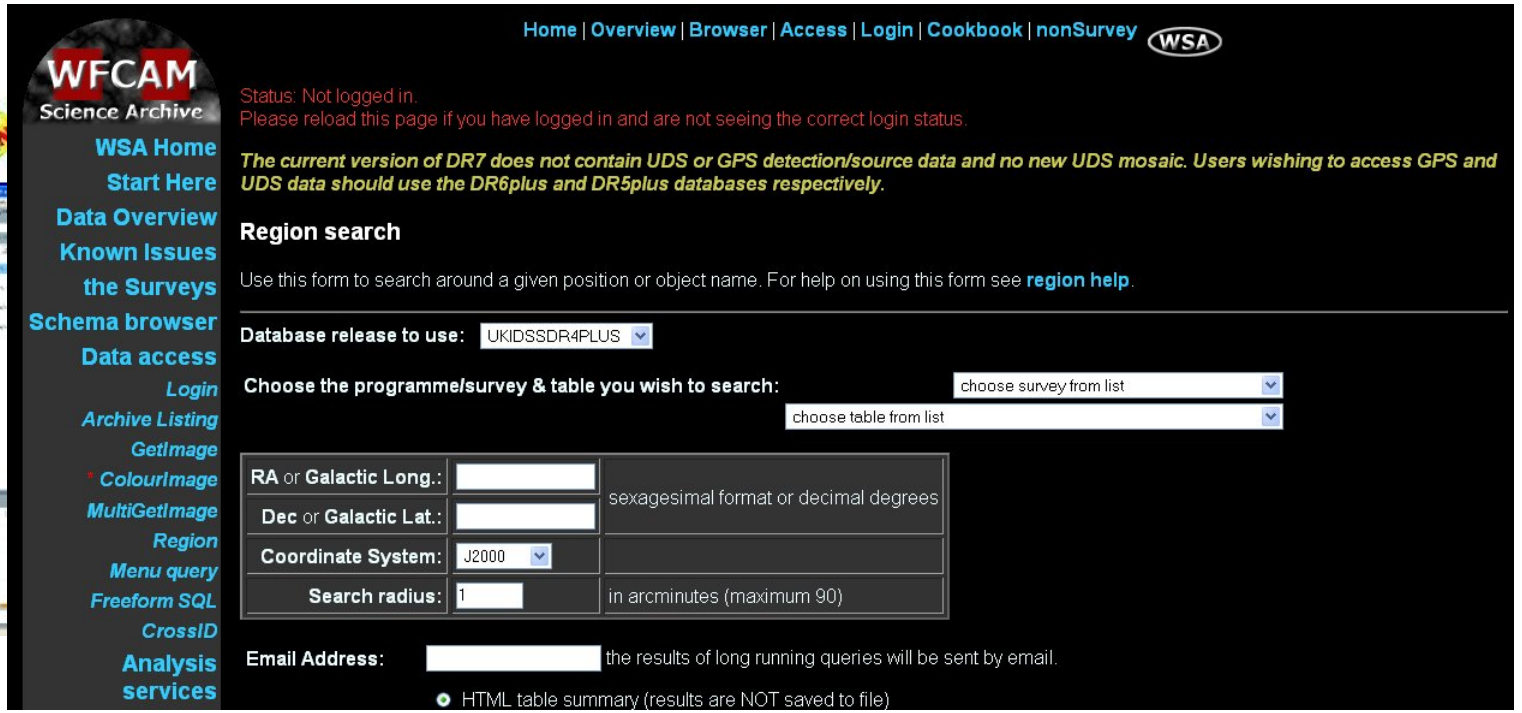
Solano,



Rhee et al. 2006

The workflow

Cross-correlation: GALEX & UKIDSS (LAS). Region: 80 sqdeg.



The workflow (II)

Filtering:

- GALEX magnitudes in the two bands (FUV, NUV)
- Brighter than the limiting magnitude
- Color selection (FUV-NUV) & (FUV-K)
- UKIDSS counterparts classified as point sources

Operations with columns:

- Reddening correction (FUV, NUV, K)

Cross-correlations:

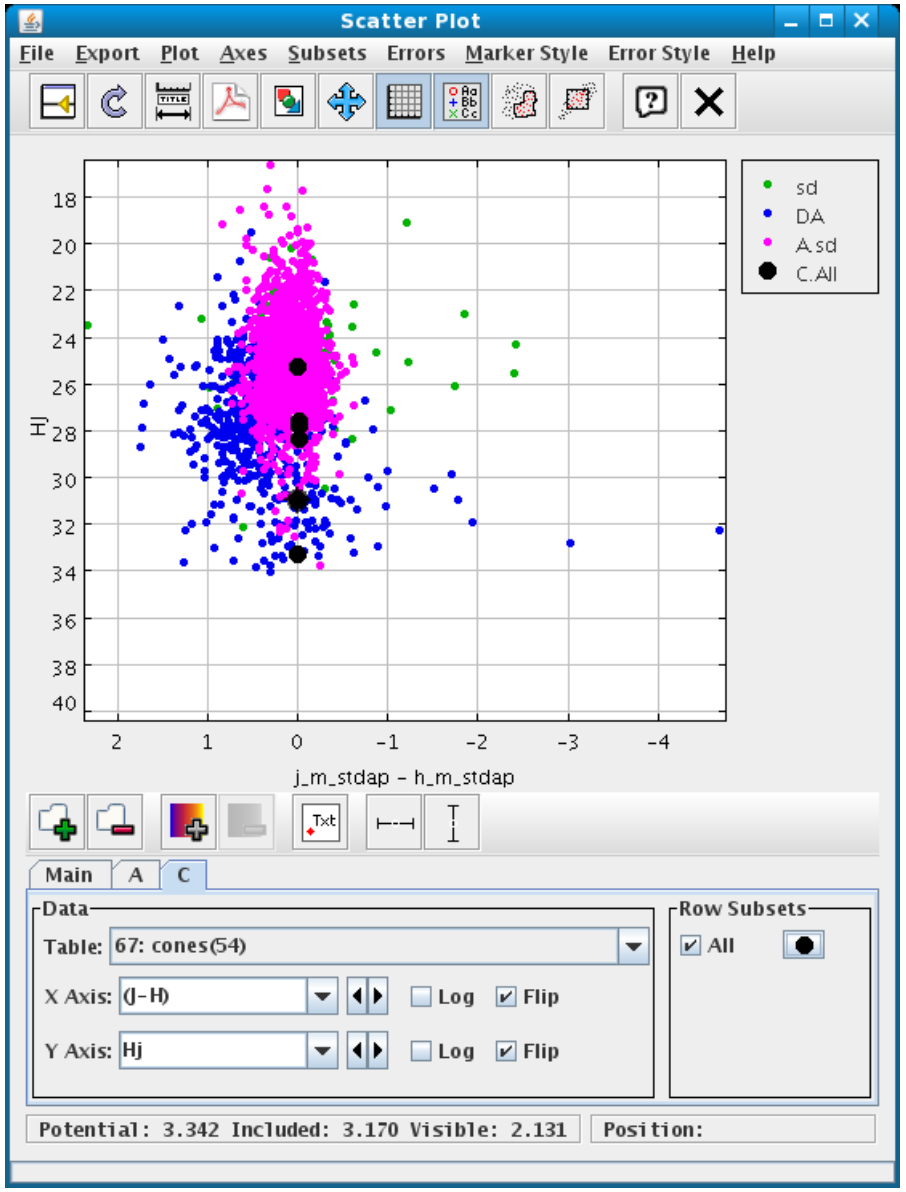
- Catalogues of hot subdwarfs and white dwarfs to identify already known objects.

Tools: TOPCAT & Aladin in script mode

The workflow (IV)

Removal of false candidates:

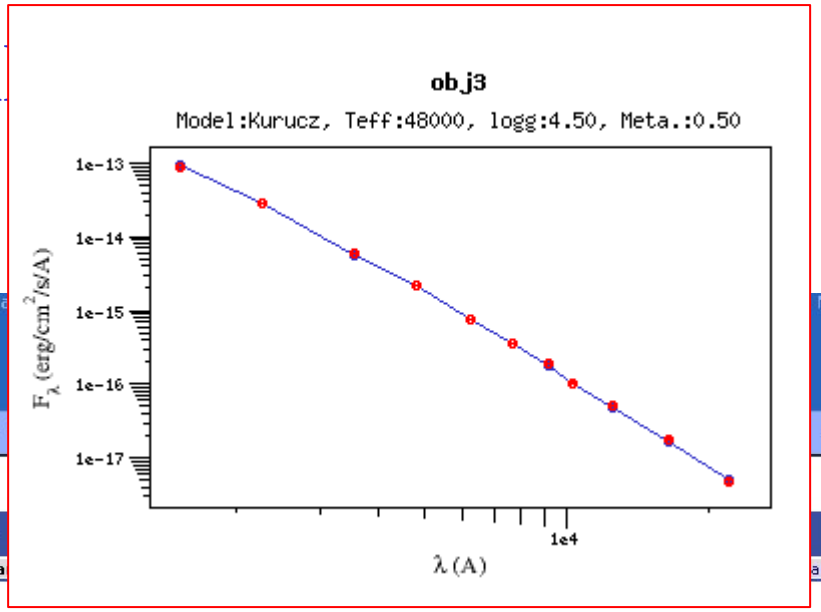
- Reduced proper motion



The workflow (III)

Removal of fa

- Spectral Energy



Object	RA	DEC	D (pc)	Model	T_{eff}	logg	Meta.	χ^2	M_d	F_{tot}	ΔF_{tot}	F_{obs}/F_{tot}	L_{bol}/L_{sun}	$\Delta L_{bol}/L_{sun}$
obj1	180.8307498457279	9.164315103103256	10.000	Kurucz	7750	5.00	-2.50	5.55e+3	5.29e-3	6.79e-11	4.63e-13	0.60	2.12e-4	1.44e-6
obj10	186.4390121922736	8.402052798427926	10.000	Kurucz	9750	4.50	-0.50	2.06e+1	1.39e-3	2.36e-11	4.52e-14	0.26	7.37e-5	1.41e-7
obj11	186.75520217302767	5.065779336035906	10.000	Kurucz	10000	2.50	-2.50	4.25e+1	2.82e-3	5.27e-11	1.56e-13	0.26	1.64e-4	4.87e-7
obj12	186.78782189470675	7.276278955958508	10.000	Kurucz	19000	2.50	-2.00	9.81e+2	1.00e-4	2.50e-11	1.50e-13	0.22	7.78e-5	4.66e-7
obj13	186.84594794281622	8.614718694686276	10.000	Kurucz	14000	2.00	-2.00	5.81e+1	2.30e-4	1.73e-11	2.21e-13	0.29	5.40e-5	6.89e-7
obj14	187.34258413324827	9.056391061589835	10.000	Kurucz	14000	2.00	-2.50	5.99e+1	1.26e-4	8.90e-12	1.69e-13	0.26	2.78e-5	5.27e-7
obj15	187.90652283880118	7.772738704146152	10.000	Kurucz	22000	3.00	-1.50	9.18e-1	4.43e-5	1.79e-11	4.24e-13	0.14	5.57e-5	1.32e-6
obj16	188.0161298227271	7.086691007698822	10.000	Kurucz	17000	2.50	-2.00	3.63e+1	8.61e-5	1.35e-11	2.47e-13	0.25	4.20e-5	7.71e-7
obj17	188.29016354502718	8.576264011357273	10.000	Kurucz	7000	5.00	-2.50	2.48e+3	3.83e-3	2.65e-11	1.58e-13	0.50	8.24e-5	4.91e-7
obj18	188.3023628652089	4.960400362886759	10.000	Kurucz	14000	2.00	-0.50	8.64e+3	3.29e-3	2.40e-10	5.88e-13	0.30	7.48e-4	1.83e-6
obj19	188.34663883084156	6.421609665422582	10.000	Kurucz	26000	5.00	-2.50	2.95e+3	1.52e-3	1.17e-9	9.92e-13	0.17	3.63e-3	3.09e-6