



Activities DCA WP4

Final Exec+PCT meeting
Madrid, Nov. 19-20, 2008

Summary: deliverables

- D10: workshop ✓
 - proceedings (online)
 - of 28 talks presented
 - submitted : 10
 - firmly promised: ~6 (GL, JB, FG, PT, MA, FIP)
 - should: RWagner, SBorgani?
 - declined: 6 (MSteinmetz, VS, JS, GK, SC, MSpaans)
 - proceedings philosophy should be decided beforehand (→AIDA)
 - D11: whitepaper (in progress still)
 - delay due to conflicting info about scope (report vs. independent white paper)
 - due half December (main contributors HW, GL; others welcome)



Summary: partner projects

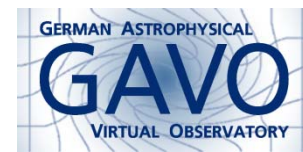
- see slides below.

Summary: IVOA

- DCA very active in IVOA theory IG
- extra SNAP workshop April 2007
 - SNAP => SimDB+SimDAB early 2008
- Main efforts
 - SimDB (GL+LB and others)
 - SimDAP (CG, GL, HW, LB, ...)
 - micro-simulations (MCervino)

Summary: other WPs

- WP2:
 - theory pages in census
 - first analysis incorporated in WP2 census; summary to be included in the white paper
- WP3:
 - theory session in June 2008 workshop
- WP5:
 - co-organised the workshops



Activities

- Workshop (D10)
- Partner activities
 - France (CNRS)
 - Germany (MPE)
 - Italy (INAF)
 - Netherlands (NOVA)
 - Spain (INTA)
 - UK Leicester
- IVOA activities
- Whitepaper (D11)



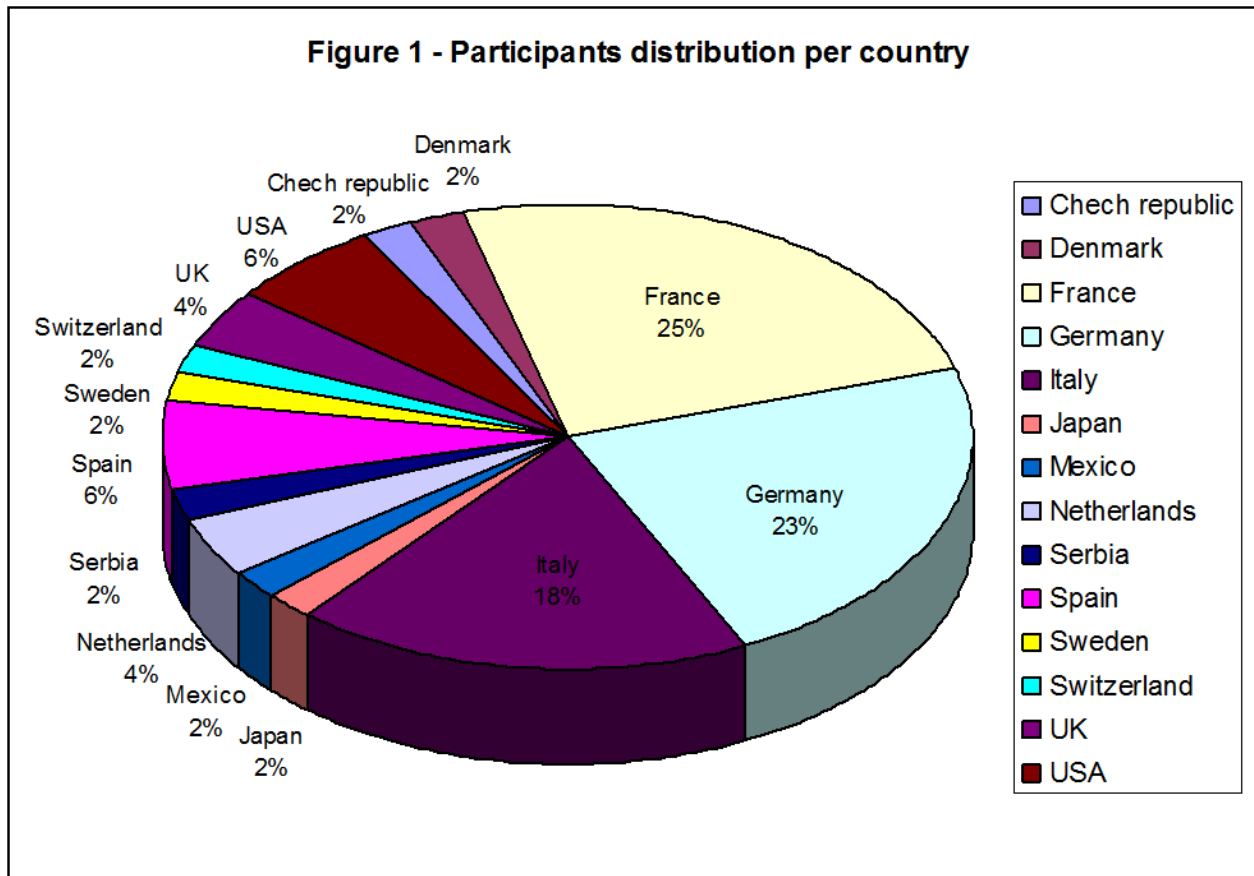
Workshop

- Garching, 7-9 April 2008
 - followed by WP5 workshop: 9-11 April
- Links
 - [official workshop page](#)
 - [DCA twiki](#) (+hidden Theory Web)
- Allowed to invite some people from outside EU
 - thanks Françoise!

Participants

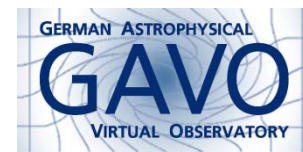
■ Czech republic	:	1
Denmark	:	1
France	:	12
Germany	:	11
Italy	:	9
Japan	:	1
Mexico	:	1
The Netherlands	:	2
Serbia	:	1
Spain	:	3
Sweden	:	1
Switzerland	:	1
UK	:	2
USA	:	3
■ total	:	49

Participants (thanks Mathias)



Speakers (invited)

■ France	:	8 (7)
Germany	:	6 (4)
Italy	:	4 (3)
Mexico	:	1
The Netherlands	:	2 (2)
Spain	:	2 (2)
Switzerland	:	1 (1)
UK	:	2 (2)
USA	:	2 (2)
■ total	:	28 (23)





Invited Speakers

Speaker	Status	Session	Title	DCA partner
Francoise Genova	C	Introduction		DCA
Mark Allen	C	Introduction		DCA
Gerard Lemson	C	Introduction		local
Volker Springel	C	3D simulations		local
Stefano Borgani	C	3D simulations		INAF
Joop Schaye	C	3D simulations		NOVA
Herve Wozniak	C	3D simulations		CNRS
Rick Wagner, USA	C*			WP4 chair
Santi Cassisi	C	micro-simulation		INAF
Leo Girardi	D	micro-simulations		INAF
Peter Hauschildt	D	micro-simulations		MPE
Maurizio Salaris	C	micro-simulations		LU
Franck LePetit ?	C	micro-simulations		CNRS
Onno Pols	D (IAU meeting China)	micro-simulations		NOVA
Carlos Rodrigo	C	micro-simulations		INTA
Stephane Charlot	C	theory-theory interoperability		CNRS
Ilian Iliev, Switzerland	C*	theory-theory interoperability		WP4 chair
Peter Teuben, USA	C*	theory-theory interoperability		WP4 chair
Ben Panter	C	theory-observational interface		LU
Guinevere Kauffmann	C	theory-observation interface		local
Emmanuel Bertin	C**	theory-observation interface		CNRS
M. J. Monteiro, Portugal	D*	theory-observational interface		WP4
Matthias Steinmetz	C	Theory, VObs and Grid		MPE
Simon Portegies-Zwart	D	theory, VObs and Grid		NOVA
Luis Manuel Sarro	C	Theory, VObs and Grid		INTA
Nic Walton	C***	theory, VObs and Grid		LU
Jeremy Blaizot	C	theory VObs and Grid		WP4 chair
Marco Spaans	C	theory VObs and Grid		NOVA

* Acceptance may depend on possibility of funding persons from outside EU/DCA partners.

** Conditional, would like proceedings to serve as reference to his products.

*** Cancelled



Program

- Focused on science
 - intro
 - 3+1D simulations
 - microphysics simulations
 - theory-theory interoperability
 - theory-observational interface
 - computational infrastructure
- Lots of discussions

First Conclusions (contd)

- 3+1D (“macro”) simulations
 - Interest in community high for access ([Millennium](#))
 - Interesting services should be deployed:
 - visualisation
 - Data formats need attention (binary VOTable, HDF5)
 - “Comoving units” ?
 - Willingness to try out IVOA standards (France, Germany, Italy, US)
- Development in IVOA
 - SimDB for discovery
 - SimDAP for access services

First conclusions (contd)

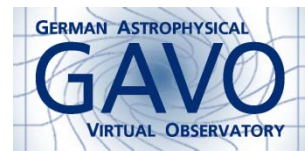
- Focus “micro-simulations”
 - many opportunities for interoperability
 - community has been pondering standardisation
 - participants are willing to contribute to VO efforts
 - workshop “planned”, possibly financed by AIDA?
 - IVOA TIG focus

Next steps

- proceedings
 - free (by Memorie della Società Astronomica Italiana – Supplementi, <http://sait.oats.inaf.it/Supplementi.htm>).
 - earliest March 2009
 - dead line August 31 → **NEW: End of Nov.**
 - not mentioned in the workshop announcement → **voluntary**
- use results in whitepaper

Census on theory data centers

- 15 institutes responded
- 23 archives (mainly micro-simulations)
- 10 services (focusing on theory/observation interface)
- ~ 250 users issuing ~ 10^6 queries per year
- *non-classical* data types: particle properties, hierarchical trees, isochrones, rate coefficients...
- great interest for VObs compliance; already applying VObs techniques to a certain degree (VOTable, registered, DAL, SNAP)



Partner projects: France

- Work efforts by DCA hire:
Laurent Bourges
 - HORIZON Project
(<http://www.projet-horizon.fr>)
 - PDR (photo dissociation region) code in SimDB

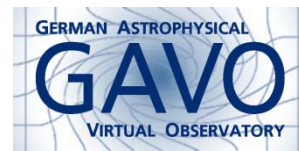
HORIZON Project (<http://www.projet-horizon.fr>) (from Hervé Wozniak)

- Goals:
 - Understanding the formation mechanisms of large-scale structure, Clusters of galaxies, Galaxies (also their evolution) and the Milky-Way
 - Producing mock observations/catalogues/light cones **publicly available** for:
 - Science preparation for forthcoming instruments (VLT/Muse, PLANCK, etc.)
 - Analysis of large surveys (eg VVDS)
- Methods:
 - 'extreme' large-scale simulations (eg 4096^3 particles Horizon4Pi simulation)
 - direct formation of baryons and/or semi-analytical modelling (Mare Nostrum sim.)
 - Results in RDB accessible as much as possible thru VO standards

Horizon (contd)

- Products:

1. Semi-analytical galaxies in Dark-Matter only simulations ('GalICS' approach)
 - Semi-analytical modelling needs catalogues of DM halos and merging trees
 - Catalogues soon available at <http://horizon-vo.univ-lyon1.fr/GalICS>
 - **SimDB development and test implementation**
2. Direct simulations of galaxy formation ('Mare Nostrum' simulation)
 - Formed by small scale star formation recipes
 - But also formed by semi-analytical modelling (to be compared with 1.)
 - Analysis (galaxy-finder) in progress
3. Galaxies mergers simulations ('GalMer')
 - Several thousand of mergers simulations
 - True color images and spectra with Pegase-HR
 - Database of snapshots (Level 0) and calibrated images/spectra (Level 2) available at <http://galmer.obspm.fr>
 - **SNAP v0.5 DM implementation and full Characterization**



Implementation of SimDB on PDR simulations

Franck Le Petit, Laurent Bourgès

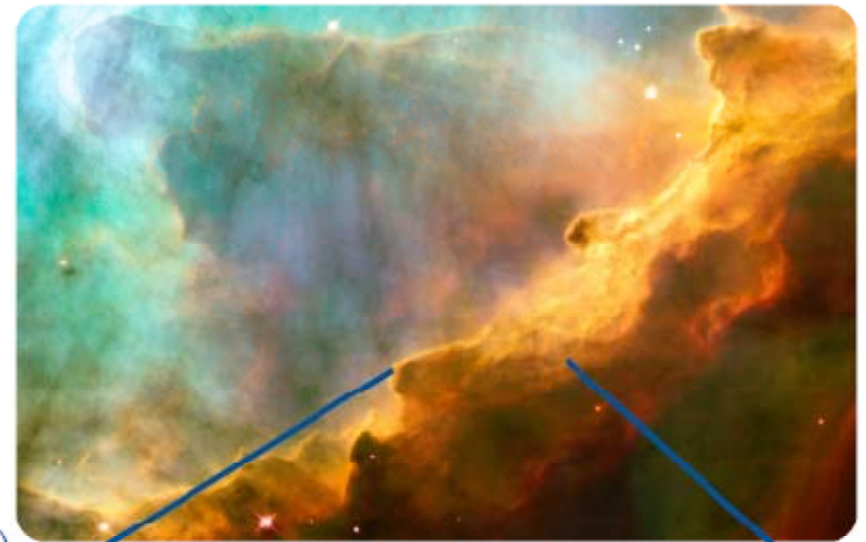


Photodissociation Region simulations

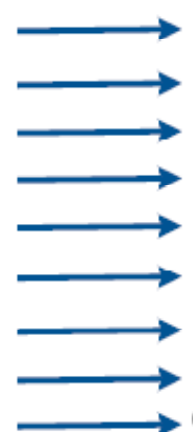
Case:
codes computing the microscopic structure of
astrophysical objects

They provide as outputs:

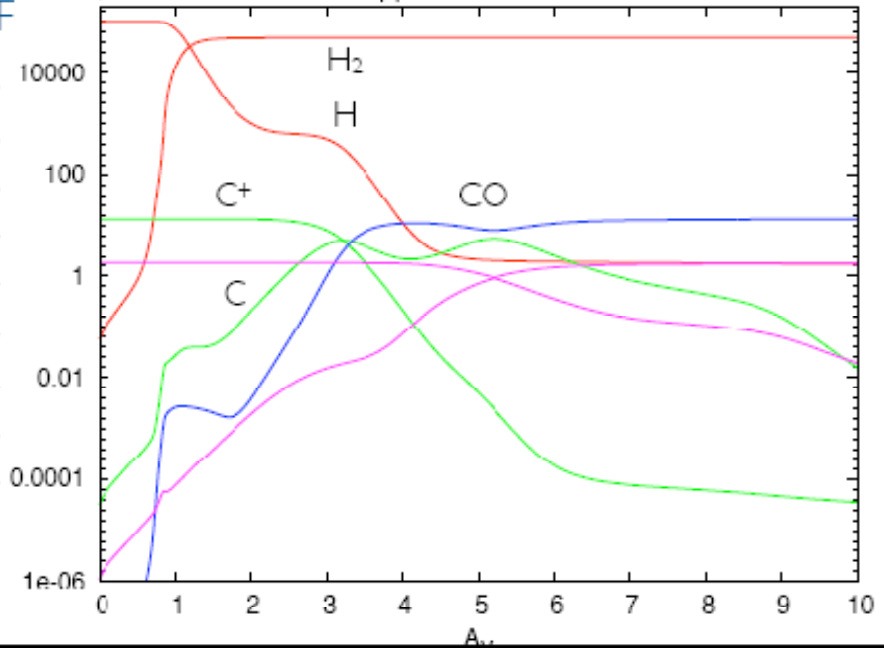
- temperature profile
- chemical abundances
- ionization degree of species
- level excitation
- line emissivities
- heating rates
- cooling rates
- many other quantities



FUV
(13.6 eV - 6eV)
 $10^5 \times \text{ISRF}$



$n_H = 10^5 \text{ cm}^{-3}$



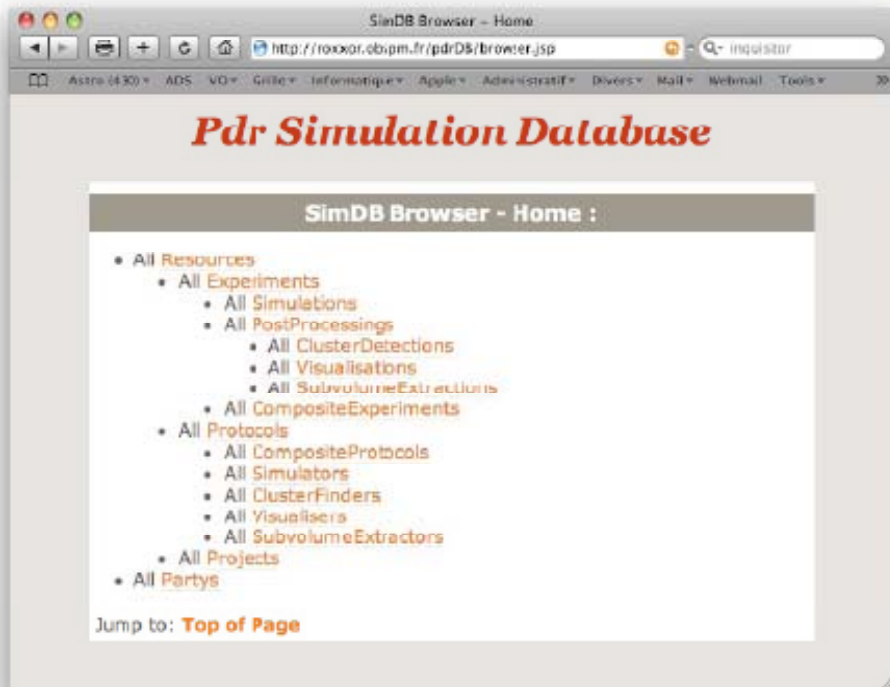
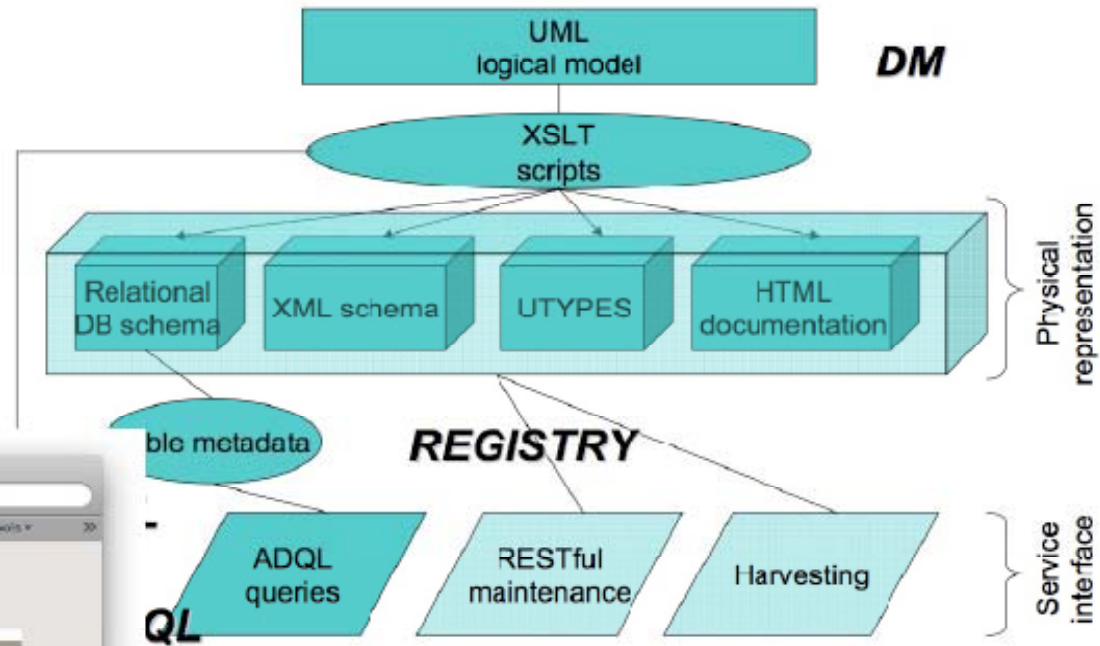
Observables

- line intensities
- column densities
- spectra



Implementation of SimDB on PDR simulations

- Use SimDB to:
 - creation of the database (*registry*)
- Protocol
 - code description
 - properties
- Experiments



SimDB "administrative" browser

Challenges :

- ID stationary code
- large number of heterogeneous properties
- not obvious to know how to map SimDB DM that is optimized for 3D+I simulations

Nevertheless :

- it works
- Prototype : <http://roxxor.obspm.fr/pdrDB/index.jsp>

Query the model parameters :

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To query the PDR models, please select a protocol :

Protocol : Pdr1.2_chimie08-test
First test protocol

Please select a least one criteria on parameters :

ID	Parameter	Possible values	Value
282	nH_init	100.0, 500.0, 1000.0, 10000.0	<input type="text"/>
328	radp_ini	1.0, 5.0	<input type="text"/>
323	radm_ini	1.0, 5.0, 10.0	<input type="text"/>
317	Av_max	1.0	<input type="text"/>

Conclusion

Partial implementation of SimDB on PDR simulations done

- SimDB can describe PDR simulations
- no reflexion on spectra yet : related to SSAP

Difficulties to implement SimDB:

- to fill RepresentationObject / Properties
- Vocabulary is missing for:
 - quantities related to Atomic and Molecular physics
 - name for chemical species
 - specific paramotors

Difficulties to use SimDB

- to query on parameters when the number is large
- to query on characterisation for inverse problem

SimDAP

- should be usefull for PDR simulations
- need to take into account:
- ▶ Problem of large number of properties
 - ▶ Multi-download

Partner projects: Germany

- (Co-)organised DCA workshops
 - complete: WP4
 - locally: WP5
- SNAP (SimDB+SimDAP) development
- Code generation pipeline ("VOTransformer")
 - DM based development
 - with Laurent Bourges especially
 - SimDB browser
- Database access to LSS simulations Horizon, Lyon
 - with Jeremy Blaizot and Laurent Bourges
 - set up interface similar to Millennium Run database

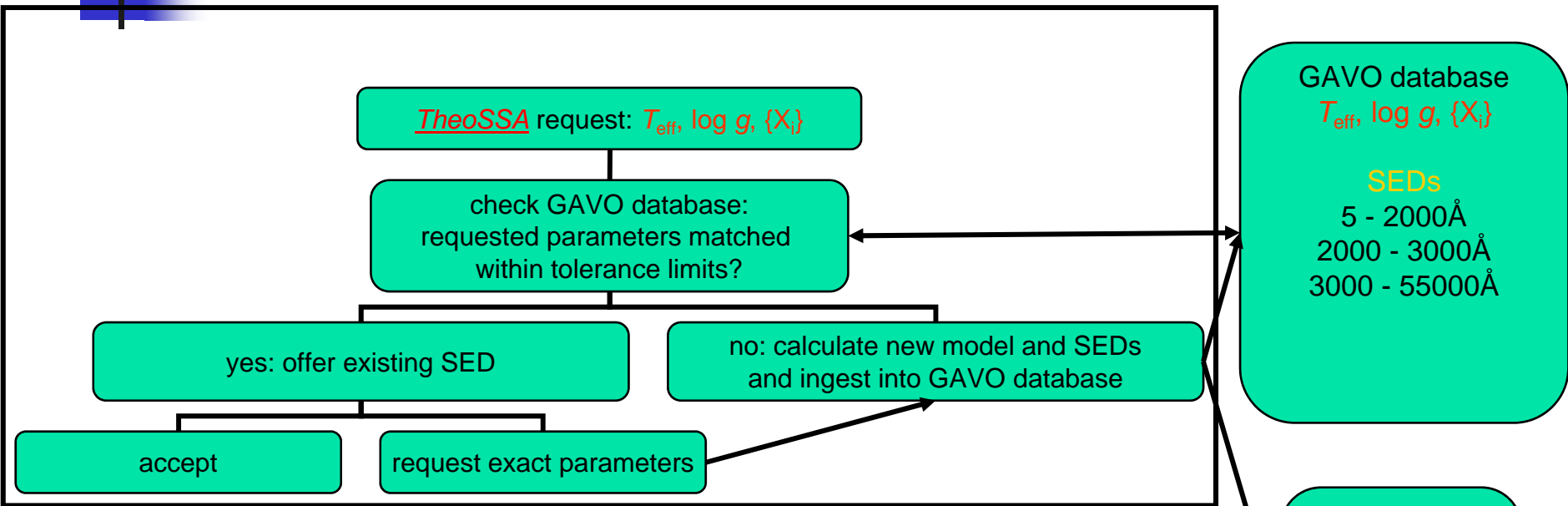
GAVO: Millennium Database

- Arguably most successful theory-in-the-VO project thus far
 - ~9000 hits per day
 - 250 registered users
 - ~6 million individual SQL queries submitted
 - > 50 billion rows returned
 - supported >50% (estimate S. White) of >160 papers on Millennium simulation

TheoSSA – Model SEDs on Demand

- GAVO service to access SEDs at three levels
 - pre-calculated model-atmosphere grids and SEDs in GAVO database
 - calculate individual SEDs with standard model atoms (H, He, C, N, O)
 - create individual model atoms for detailed analyses and calculate models and SEDs
- all new calculated SEDs are ingested in GAVO database
 - growing in time
- calculation of model grids on compute resources of AstroGrid-D

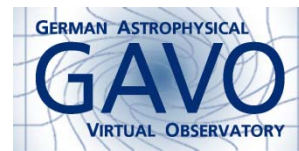
TheoSSA



Partner projects: Italy

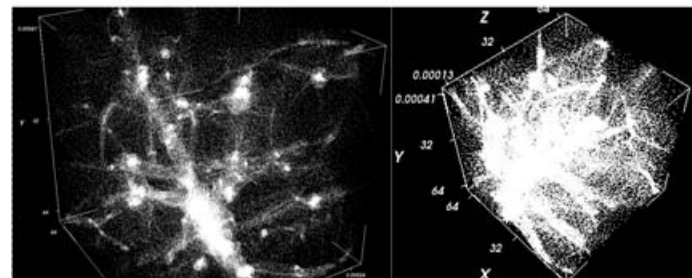
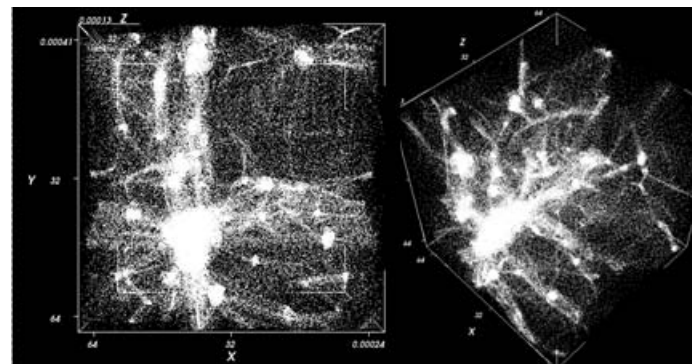
(from Patrizia Manzato)

- the creation of a new archive in Bologna with some Enzo simulations at different red-shift which meta-data are stored in ITVO@Trieste database, so to construct a distributed archives structure;
- we stored all 103 snapshots of a big Gadget2 simulations at level 0 of the database;
- add FLASH data at ITVO@Catania;
- links all the levels of the ITVO database;
- from the ITVO@Trieste web portal is possible to launch the Aladin applet v. 5.013 with the glufile for add the personal dictionary to view and search the maps of simulated galaxy clusters;



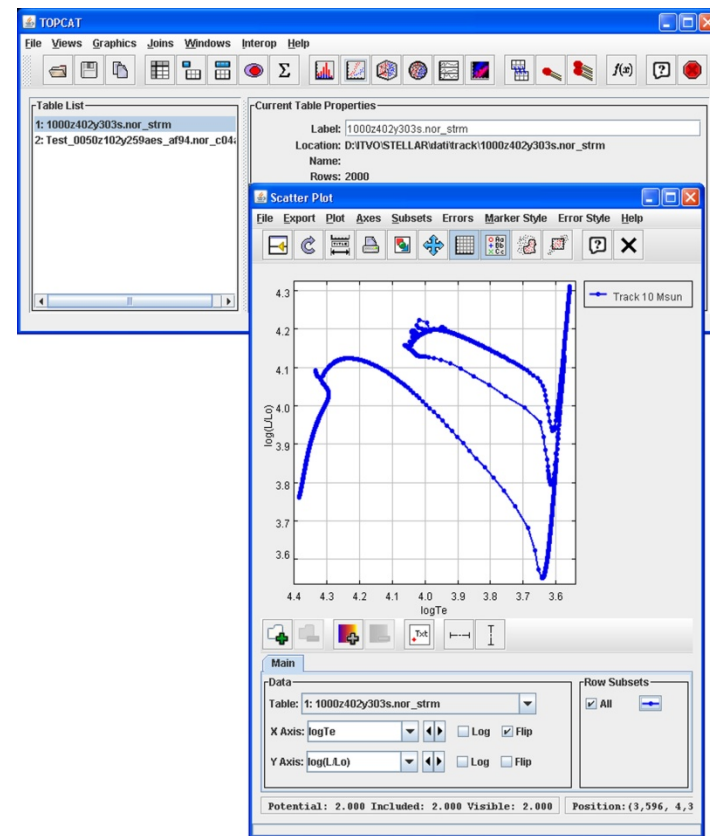
Italy (contd.)

- Development of VisIVO Server by OACatania, that will permit to visualize the cosmological data server side
- Presented at theory and June workshops



Italy (contd)

- assess the feasibility of including different sets of theory data and services in the VObs.
- In particular for stellar evolutionary data like tracks and isochrones computed with the FRANEC code the OATrieste and OATeramo have developed a new web portal that can query the new BaSTI relational database and transform on-the-fly the ASCII output file in a VOTable format, so to be interoperable with TOPCAT tool.



Partner projects: Netherlands

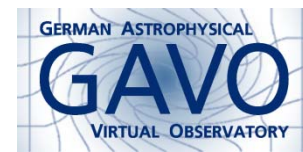
(from Joop Schaye)

- We participated in the workshop in Garching, also in the organization.
- We wrote a proposal to get funding from NOVA (which listed EV and GL), which will unfortunately probably not be successful.

Partner projects: Spain

(from Miguel Cerviño)

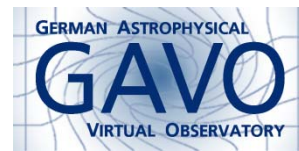
- MC member SAC for SNAP Workshop (Garching, April 2007)
- Spectroscopy in the VO (May 2007): Several contributions (2 oral and several posters) in the subject of the inclusion of theoretical spectra in the VO and its peculiarities and the presentation of services that provides access to stellar evolution/atmosphere/populations results.
- Preliminary meetings to discuss the inclusion of non N-Body simulations in the VO with Frank Le Pettit (August 2007)
- Theory workshop (Garching, April 2008): With special emphasis in the coordination of the workshop program related with stellar evolution/stellar content/photoionization and related aspects. We also participate in the workshop with several posters and with two review talks.
- Coordination of the micro-simulation session in the May IVOA Interop (2008), and some contributions to these session.
- Work in progress: Definition of simple access of micro simulations results, together with the Italian VO.
- TSAP → S3: Simple Self-described Service



Partner Project: Leicester

(provided by Jonathan Tedds)

- Creating pointings to (made available through AstroGrid)
 - theory/modelling services, e.g.:
 - <ivo://org.astrogrid/Galaxev>
 - <ivo://it.napoli.voneural/PDR>
 - classifier services, e.g.:
 - <ivo://org.astrogrid/annz>
 - <ivo://org.astrogrid/BPZ>
 - data mining services, e.g.:
 - <ivo://it.napoli.voneural/VONeuralBroker>
 - <ivo://it.napoli.voneural/VONeuralMLP>
 - DAL services, e.g.:
 - <ivo://uk.ac.cam.ast/skads-dsa-catalog/S3>
 - <ivo://uk.ac.cam.ast/tpmhalocat/tpmhalocat>



IVOA activities

- Herve Wozniak new chair TIG
 - Claudio Gheller vice-chair
- SimDB
 - Collaboration with WGs (to be) formalised
 - proto-type implementation developed by DCA (GL+LB)
- SimDAP
 - Claudio Gheller (INAF) lead
 - ...

White paper: Status and Plans

- D11: month 26, October 2008
 - misunderstanding regarding report vs. white paper
 - resolved only 2 weeks ago
 - restarted white paper writing
 - → *deadline half December*
- Writing in progress (GL, HW, JZ)
 - send draft to TEG end November (90% content)
- Concentrated on IVOA developments
 - SimDB/SimDAP, micro-simulations, semantics
- Include workshop results & discussions
- Include census results (JZ)



The End
