Atomic and Molecular Databases in the Virtual Observatory

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History

- <u>Oct. 2002</u>, Poster at ADASS12 on BASECOL in VO, (from Besançon Observatory)
- <u>2003</u>, Workshop :
    - Survey of astrophysical community for needs
    - Introduction of VO concept to french physicists
  - Explain interest to software people (ADASS 13)
  - Part of MDA
- <u>2004</u>, explain interest to :
    - french astronomical community (SF2A)
    - Databases leaders (HITRAN, ICAMDATA): collab.
    - IVOA consortium (VOTheory, Pune): coll. P. Osuna
  - Work on UCDs (with E. Roueff and S. Derrière)

History (2)

- 2005
  - BASECOL : Data model and VOTable prototype (N. Moreau, B. Debray)
  - Start of FP6 « Research Training Network », with one task devoted to interoperability between BASECOL, CDMS (spectrosc.), UMIST reactive database, CASSIS
  - Part of PPF VO 2006-2009, Paris Observatory
  - Launching of Working Group at IVOA: DAL SpectralLineLists
    http://www.ivoa.net/twiki/bin/view/IVOA/SpectralLineLists

Now

- « fundamental processes » is next step in all VO
  Absolute need for coordination among users and providers

- Most molecular and atomic data providers contacted and part of the WG
- A large community is now interested and convinced : work can really start with all partners

UCDs work
ML Dubernet, E Roueff (coll. S. Derriere)

- Divided field in 5 sections
  - identification of elements (name, etc..)
  - identification of levels (quantum nbers, initial/final)
  - radiative transitions between bound states (wavelength, etc..)
  - photon-matter interaction and collisions (Xs, rate coeff.,etc..)
  - some specific UCDs for various quantities (dipole moment, etc ...)
- Separated atoms and molecules for some items
  - phys.at
  - phys.mol
  - phys.atmol

Data Modeling and Data Access Layer

- WG : software developpers, astronomers, physicists, physics databases (collab. With ESAC: P. Osuna and ESO: F. Kerber)
  - Identification of ressources and their formats
  - Identification of needs from
    - « Astronomical » community
    - Packages
- DB : NIST (atomic & molecular), CFA (HITRAN, etc..), CHIANTI, TIPTOPbase, DREAM, VALD, JPL, CDMS, GEISA, réseau SPECMO et ses bases, NIFS (Japan), UMIST, etc...

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Spectral Line Lists

Collaborative page dealing with Spectral Line Lists

(Add pages as necessary)

- Objectives
- News
- Working documents
- Meetings
- Roadmap
- Links
- How to contribute
- Involved People

Objectives

Our objective is to provide access to Atomic and Molecular Databases within the VO environment. Our first goal will be providing access to spectral line lists.

News

Latest developments in the workgroup

Working documents

Documents related to Spectral Line Lists can be found here: SpectralLineListsDocs.

Meetings

Roadmap

ivoa.net

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Documents dealing with Spectral Line Lists

(Add pages as necessary)

- General Working Drafts
- Specific sections related to topic
  - Needs for astrophysical use (general facts, line lists used by packages ...)
  - Description of available databases
  - Various useful documents
- Meetings' presentations

General Working Drafts

- new-ucd.ps: Preliminary work on atomic and molecular UCDs

Specific sections related to topic

Needs for astrophysical use (general facts, line lists used by packages ...)

- stellar-solar-ism.pdf: Needs for stellar (B. Plez), solar (S. Sahal) and ISM studies

Description of available databases

Various useful documents

- ucd1p-words.txt: see UCD WG : UCD1+ words
- WD-UCDlist-20040823.pdf: see UCD WG : explanations on UCDs
- NoteEMSpectrum-20040520.pdf: see UCD WG : notes on EM spectra

Meetings' presentations

- pune.pdf: InterOpSep2004 meeting

Attachment ↓	Action	Size	Date	Uploaded by	Comment
📄 new-ucd.ps	manage	53.8 K	29 Mar 2005 - 12:42	MarieLiseDubernetTuckey	Preliminary work on atomic and molecular UCDs

For access from Web Interface or protocole

- SLAP1 (same way as SIAP, SSAP)
  - Services providing SLAP1 are registered with URL : « coarse » registration
  - Tools query registry to find adresses of ressources with SLAP1 access, do there and retrieve a file with characterization of data + URL of data, then retrieve data ----> NOT THE BEST OPTION
- SLAP2 (same way as EGSO)
  - « providers » make interface between ressources and VO community ---> VERY HEAVY PROCEDURE because of documentation of data

DAL (2)

- SLAP3 (the option I would prefer)
  - Services are registered with « fine registration » : molecules, frequency range, quantities of interest, measured and/or calculated data, etc...
  - Tools must query with specific query langage
    - Service provides URL of ressources
  - Tools go to URL, retrieve a METADATA file containing description of fields in table (DM of database), then data are retrieved in VOTable

  For this, we need a General Data Model, the individual METADATA files describe a subset of the GDM

Why SLAP ?

- 1rst Goal : Spectral lines access
- 2nd : what is needed for non ETL-media
- Last : everything else necessary for modeling « astrophysical » media

Data Model

- General description of quantum numbers
  - Modeling of couplings
- Theoretical/Experimental quantities must be documented
  - Commun problem to VOTheory
  - Problem of fitting functions
  - Accuracy
  - Exact formula for quantity of interest

Join us !

http://sympa.obspm.fr

Liste vo-physics

Project of Paris Observatory 2006-2009

- Build from the UCDs, DAL, DM work

- Have a « fine registry » at Paris Observatory

- Provide a Query Web Interface

- Be a « Provider » for some databases