2028-7

Joint ICTP/IAEA Workshop on Atomic and Molecular Data for Fusion

20 - 30 April 2009

**Atomic Molecular and Particle-Surface Interaction
Web Databases and Data Exchange
Lecture 2 - Bibliographic Data**

Denis HUMBERT

*IAEA, Div. of Physical & Chemical Science
Dept. of Nuclear Sciences & App. A-1400
Vienna
Austria*

Atomic, molecular and particle-surface interaction web databases and data exchange

Lecture 2
Bibliographic Data

ICTP Workshop on Atomic and Molecular Data for Fusion Energy Research
Trieste, 20-30 April 2009

Denis Humbert

Content

Bibliographic Search

- Bibliographic databases
  - AMBDAS, IAEA
  - CFADC, ORNL Oak Ridge
  - GAPHYOR, University of Paris XI
- Specialized databases
  - NIST: energy levels, transition probabilities, line broadenings
- Web search engines
  - General: Google, Yahoo…
  - Scholar: Crossref, Google Scholar, INIS
- Electronic publishers
  - AIP, IOP, …
- On line libraries: LANL, NASA

Bibliographic databases

- General Databases for A+M, PMI and Fusion Research
  - AMBDAS, IAEA, Vienna Austria
    http://www-amdis.iaea.org/AMBDAS
  - CFADC, ORNL, Oak Ridge USA
    http://www-cfadc.phy.ornl.gov/bibliography/search.html
  - GAPHYOR, Université Paris XI, Orsay France
    http://gaphyor.lpgp.u-psud.fr/gaphyor/gaphyor.html

- Specialized databases
  NIST Atomic Spectra Bibliographic databases

  http://physics.nist.gov/PhysRefData/ASBib1/index.html
  - Energy levels, wavelengths
  - Transition probabilities
  - Spectral line broadenings

AMBDAS

http://www-amdis.iaea.org/AMBDAS

IAEA bibliographic database: 140 000 records from 46 000 references

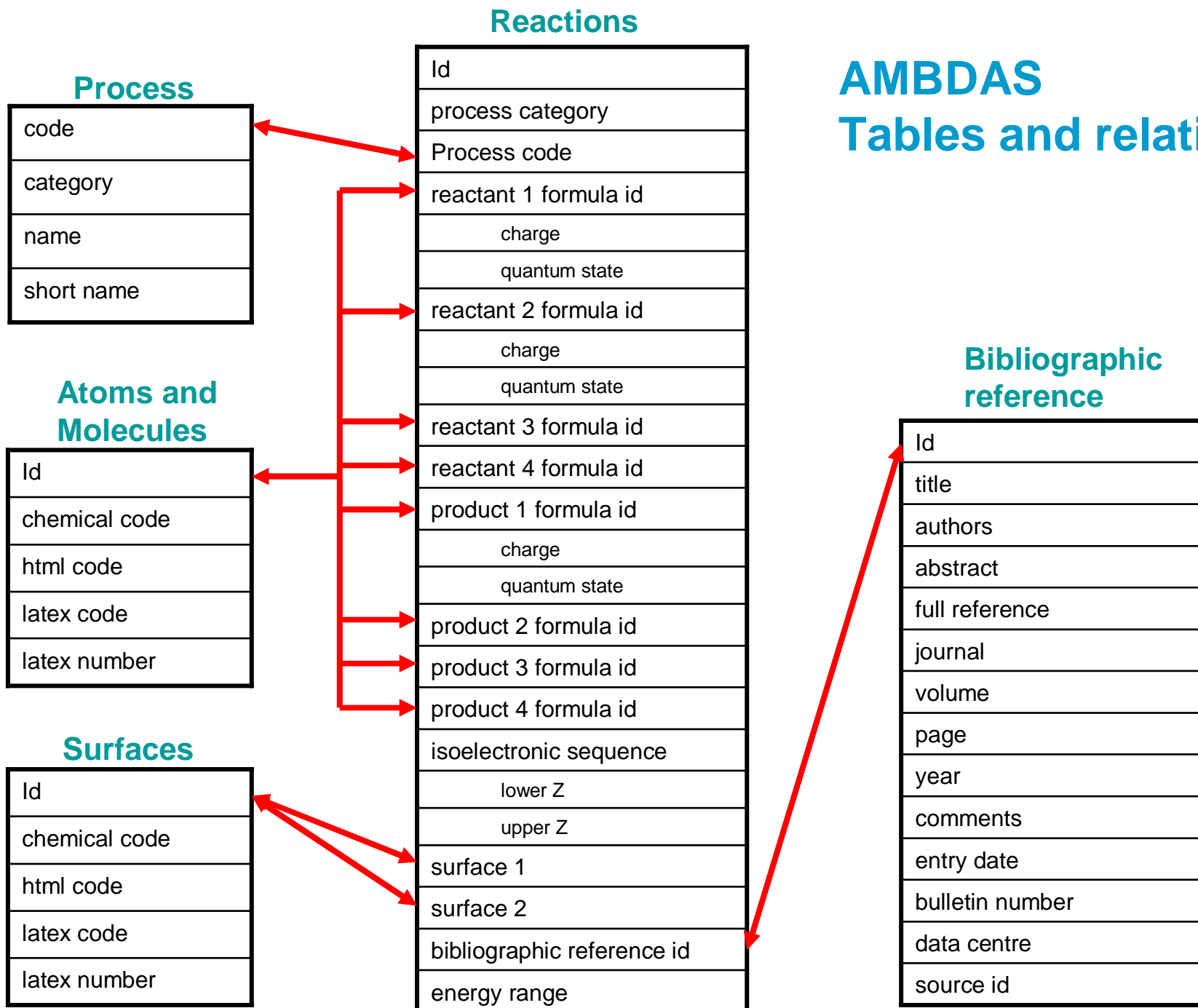Domain covered: information of interest for fusion energy research
- Structure and spectra: transition probabilities, oscillator strengths, interatomic potentials, energy levels, wave lengths
- Atomic and molecular collisions
- Surface interactions
- Particle beam-matter interactions
- Fusion research of general interest

Data collected through the DCN
- NIST: structure and spectra
- ORNL, Oak Ridge: atom and molecular collisions, plasma interactions
- Other data centres: laboratory report, thesis…

Reactions

Id	
process category	
Process code	
reactant 1 formula id	
	charge
	quantum state
reactant 2 formula id	
	charge
	quantum state
reactant 3 formula id	
reactant 4 formula id	
product 1 formula id	
	charge
	quantum state
product 2 formula id	
product 3 formula id	
product 4 formula id	
isoelectronic sequence	
	lower Z
	upper Z
surface 1	
surface 2	
bibliographic reference id	
energy range	

Process

code
category
name
short name

Atoms and Molecules

Id
chemical code
html code
latex code
latex number

Surfaces

Id
chemical code
html code
latex code
latex number

Bibliographic reference

Id
title
authors
abstract
full reference
journal
volume
page
year
comments
entry date
bulletin number
data centre
source id

AMBDAS
Tables and relations

AMBDAS Query

http://www-amdis.iaea.org/AMBDAS

- Physical/chemical criteria
  - Process category
  - Process
  - 1 or 2 reactants with or without ionization stage
  - 1 product of reaction with or without ionization stage
  - 1 surface
  - 1 isoelectronic sequence
- Bibliographic criteria
  - Keywords on title
  - 1 or 2 authors
  - Journal/book/report

AMBDAS main journals

1. Journal of Physics B   IOP
2. Physical Review A   APS
3. Nuclear Instruments and Methods
    in Physics Research section B   Science Direct
4. Physica Scripta   IOP
5. Surface Science   Science Direct
6. Astronomy Astrophysics   EDP
7. Journal of Nuclear Materials   Science Direct
8. Chemical Physics Letter   Science Direct
9. Physical Review B   APS
10. Journal of Chemical Phys.   AIP
11. Physical Review Letters   APS
12. Astrophysics Journal, Part 1   University of Chicago

GAPHYOR

http://gaphyor.lpgp.u-psud.fr/gaphyor/gaphyor.html

Domain: atomic and molecular physics
- Properties of atoms and molecules
- Photon collisions
- Electronic collisions
- Heavy particles collisions
- Macroscopic properties of gases
- Particle surface interactions

Interface and data structure
- No title
- Standard and advanced search

Electronic Publishers

- IOP   http://www.iop.org/EJ/
  - Journal of Physics B, Physica Scripta…
- APS   http://publish.aps.org/
  - Physical review A and B, Physical Review Letters..
- Elsevier (Science Direct) http://www.sciencedirect.com/
  - Surface Science, Chemical Physics Letter…
- AIP   http://www.aip.org/pubs/
  - Journal of Chemical Physics
- EDP: http://www.edpsciences.org/index.cfm
  - Astronomy Astrophysics Journal (free)
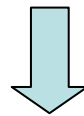
CrossRef & Google Scholar

Google Scholar against CrossRef

Strong relation between both search engines

➤ Google is involved in the CrossRef project

➤ DOI as the primary link to an article

➤ Common terms and conditions for use of publishers full text content

CrossRef

➤ Simple and easy web interface

➤ Focus on authoritative, peer-reviewed literature from a known set of sources

➤ Results delivered from Google Scholar. Only entries with a DOI kept

Google Scholar

➤ 2 web interfaces: a simple search and an advanced one

➤ Very broad search of all the web and includes any material that "looks scholarly" and the material comes from an unknown set of sources

➤ Agreement with CrossRef: if multiple versions of an article shown in the Google Scholar search results, **the first link is to the publisher's authoritative copy**

Google Scholar

http://scholar.google.com/

What is Google Scholar?
- Broad search for scholarly literature
- Search across many sources:
  peer-reviewed papers, theses, books, abstracts and articles
  from academic publishers, professional societies, preprint repositories,
  universities and other scholarly organizations.
- Google Scholar helps you identify the most relevant research across the world of scholarly research.

Features of Google Scholar
- **Search:** easy and advanced search
- **Find:** searches in papers, abstracts and citations
- **Locate** the complete paper through publishers or on the web
- **Learn** about key papers in any area of research
- **Articles ranking:** Google purports that most relevant results will always appear on the first page

Crossref

- This project is to implement full-text interpublisher searchability http://www.crossref.org/.

- CrossRef pilot launches a typical general web search but filters the result set to the scholarly research content from participating publishers, with the intent of reducing the noise produced by general web searches.

- Result is a cross-publisher citation linking system that allows a researcher to click on a reference citation on one publisher's platform and link directly to the cited content on another publisher's platform, subject to the target publisher's access control practices.

- CrossRef citation-linking network today covers millions of articles and other content items from several hundred scholarly and professional publishers.

- CrossRef is the official DOI registration agency for scholarly and professional publications.

- Crossref pilots:
    1. http://portal.acm.org/xrs.cfm
    2. http://www.iop.org/EJ/search_crossref
    3. …

International Nuclear Information System: INIS
http://www.iaea.org/inisnkm

- **Objective**: to foster the exchange of scientific and technical information on peaceful uses of atomic energy
  - Focus on nuclear data
  - A lot of AM/PSI data for Fusion Energy Research

- **3 April 2009** – Free access to INIS on the Internet

- Over 3 million bibliographic records
- Over 850 000 full-text documents
  - non-conventional "grey" literature – NCL
  - in 63 languages
  - many documents that cannot easily be found anywhere else

- **Multilingual Thesaurus**
  - Description of nuclear information and knowledge in a structured form
  - Multilingual and semantic searches.

DOI

- A Digital Object Identifier (DOI), is a unique string created to identify a piece of intellectual property in an online environment (http://www.doi.org/hb.html)

10.1006/jmbi.1995.0238

prefix   suffix
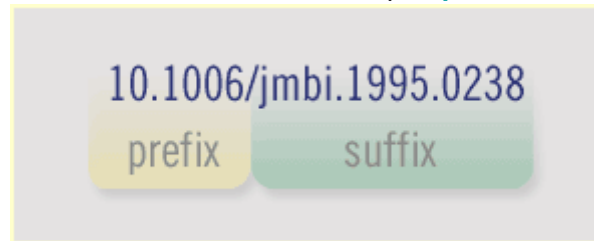
- A DOI in text or header information can be resolved by embedding it in an HTTP hyperlink to the DOI proxy, http://dx.doi.org. This redirects the DOI to the currently registered location for this content item:
doi:10.1103/PhysRevA.71.022713 can be resolved as
http://dx.doi.org/10.1103/PhysRevA.71.022713.

- To include the DOI in a citation to an article, simply append it at the end, prefaced by "doi:" as follows:

Sheng-Guang Wang, Dong-Bo Cao, Yong-Wang Li, Jianguo Wang and Haijun Jiao
"CH4 dissociation on Ni surfaces: Density functional theory study"
Surface Science, **doi:10.1016/j.susc.2006.06.008**

Web Search Engines

Google, Yahoo, Altavista…..

- Too general → lot of noise
- CrossRef or Google Scholar more efficient, (INIS ?)

Exercises

Using different databases and web search engines
http://www-amdis.iaea.org/ICTP1.html

1. Make a biblio in your field of interest for the recent years
2. Look for your own publications

For each web site, rank from 1 to 5 (1 excellent, 5 bad)
- How accurate is the result?
- How up to date is the information?
- Level of noise
- Web interface conviviality