

OPEN-ADAS: progress and plans

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 - tagging system,
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Background

- OPEN-ADAS is a joint development between the IAEA and the ADAS Project.
- Main goals are:
 - to index the data contained within the ADAS database,
 - to provide a searching system for these data,
 - to re-work the documentation and data status,
 - to provide access to the data freely via the web.
- With the exception of the last point, all of the above have benefit to ADAS Project members

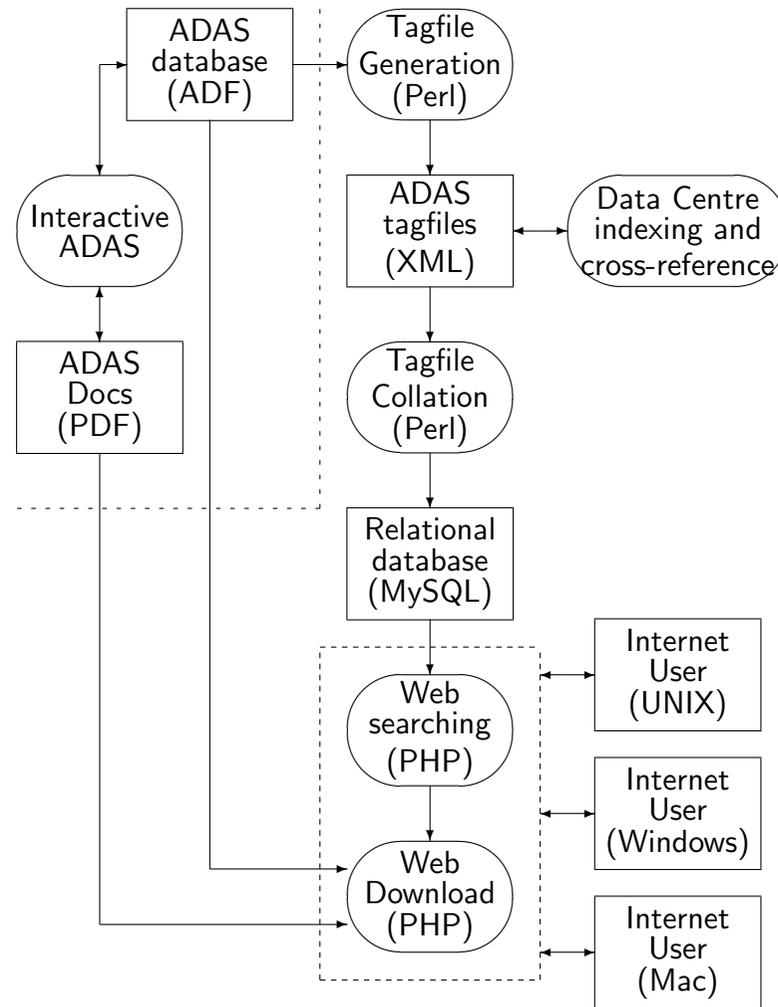
Scope of OPEN-ADAS

- OPEN-ADAS is limited to a selection of key data classes:
 - key diagnostic data classes for fusion are targeted,
 - opacity (and related data) already available,
 - no point in releasing driver files.
- OPEN-ADAS will not release any of the ADAS code, only data,
 - exception is code necessary for reading the data.
- New developments with flexible partitioning will not be included:
 - still in development,
 - need to be tuned to transport characteristics etc.,
 - best used with close support from ADAS personnel.

OPEN-ADAS data classes

Class	Description	Files	Size
ADF01	Charge exchange Cross sections	118	3.0 MB
<u>ADF04</u>	Resolved specific ion data collections	1078	404 MB
ADF07	Electron impact ionisation coefficients	67	1.8 MB
ADF08	Radiative recombination coefficients	100	2.6 MB
<u>ADF09</u>	Dielectronic recombination coefficients	1531	1.0 GB
<u>ADF11</u>	Iso-nuclear master files	343	50 MB
ADF12	Charge exchange emission coefficients	45	2.0 MB
ADF13	Ionisation per photon coefficients	153	38 MB
<u>ADF15</u>	Photon emissivity coefficients	173	77 MB
ADF21	Effective beam stopping coefficients	218	4.4 MB
ADF22	Effective beam emission coefficients	402	7.6 MB
	Total	4228	1.58 GB

Implementation



Tagging system

- Perl is used to scan each ADF file:
 - each data class is done in turn,
 - custom code is written for each data class,
 - each part of the file is examined:
 - * filename,
 - * data contents,
 - * comments section.
 - Consistency is checked and warnings are flagged.
- A corresponding '.tag' file is generated alongside the original '.dat' file.
- Tag files are actually fully compliant XML files.

Example of tag file header

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!DOCTYPE ADAS PUBLIC "-//ADAS//DTD ADAS 1.0//EN"
    "http://adas.phys.strath.ac.uk/adas.dtd">
<adf15>
  <file>
    <type>ADF15</type>
    <filename>pec96#c_pjr#c4.dat</filename>
    <directory>adf15/pec96#c</directory>
    <tagged_on>2006-07-21</tagged_on>
    <tagged_by>Allan Whiteford</tagged_by>
    <md5sum>722bda2a220dc12fe8a74c8c227bf725</md5sum>
  </file>
  <ion>
    <z0>6</z0>
    <z1>4</z1>
  </ion>
```

Transition entry in a tag file

```
<transitions>
  <transition>
    <z1>4</z1>
    <lambda units="A">40.7</lambda>
    <upper>
      <level>3</level>
      <cfg>1S1 2S1</cfg>
      <m>1</m>
      <l>0</l>
      <j>.0</j>
    </upper>
    <lower>
      <level>1</level>
      <cfg>1S2</cfg>
      <m>1</m>
```

```
                <l>0</l>
                <j>.0</j>
        </lower>
        <driving>
                <level>1</level>
                <cfg>1S2</cfg>
                <m>1</m>
                <l>0</l>
                <j>.0</j>
        </driving>
        <type>Excitation</type>
</transition>

</transitions>
```

Predecessors and contributors

- All ADAS data files contain information on:
 - Predecessors — other files in the ADAS database used in generation,
 - Contributors — people who worked on the generation of the file.
- Up until now these links had to be followed on a case by case basis by hand:
 - no automatic way of knowing where a possible error in, e.g. an ADF04 file, had propagated to elsewhere in the database.
 - In reality, these things were always tracked down by someone.
- The indexing system extracts this information from each file.
- Searchable tree is then built which forms a key part of the database generated from the '.tag' files.

Relational database

- Each '.tag' file is re-read by a different Perl script and inserted into a database.
- Using MySQL due to support within Linux and price (free!) but others (e.g. Oracle) could be used.
- Information archived according to relational database type standards:
 - data for each file is split across different tables,
 - links between files are done by unique IDs rather than filenames,
 - names of contributors are stored in separate table.
- Indexing/cross-referencing possible with data centres.
- MySQL also has ease of integration with web based software.

Web Interface

- Web interface written in PHP and outputs XHTML.
- Allows interactive searching of the database via a number of routes:
 - searching by data class,
 - cross-data class searching by ion,
 - cross-data searching by wavelength*,
 - general free-form search*.
- Gives information on contents of each data file.
- Option to download the file, reading routines or documentation.

* — Awaiting implementation.

Searching ADF15 files

OPEN-ADAS: Search ADF15 Files - Mozilla Firefox
File Edit View Go Bookmarks Tools Help

ADAS
Atomic Data and Analysis Structure

OPEN-ADAS Version 0.1B
[Help](#) | [My Account](#) | [Log Out](#)

Freeform search

Search by wavelength

Search by ion

Search by data class

Documentation

Online codes

Download codes

About ADAS

ADF04 ADF08 ADF09 ADF11 ADF12 **ADF15** ADF40

Search ADF15 Files

Wavelength

Minimum (Å)

Maximum (Å)

Ion

Element

Charge

Resolve Results By

Transition (longer list)

File (shorter list)

Comments and questions to: adas@phys.strath.ac.uk

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Results of searching ADF15 files

OPEN-ADAS: ADF15 Search Results - Mozilla Firefox
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Freeform search

Search by wavelength

Search by ion

Search by data class

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About ADAS

ADF04 ADF08 ADF09 ADF11 ADF12 **ADF15** ADF40

ADF15 Search Results

Wavelength
Minimum (Å) 3000
Maximum (Å) 4000

Ion
Element C
Charge

Resolve Results By
 Transition (longer list)
 File (shorter list)

Search for ADF15 Files

Ion	Minimum Wavelength	Maximum Wavelength	File Details
C ⁵⁺	25.5Å	19178.4Å	pec96#c_bnd#c5.dat
C ⁴⁺	35Å	12202.6Å	pec93#c_pir#c4.dat
C ⁰⁺	668.6Å	21028.7Å	pec93#c_llr#c0.dat
C ⁰⁺	668.6Å	21028.7Å	pec93#c_llu#c0.dat
C ⁰⁺	668.6Å	21028.7Å	pec93#c_pju#c0.dat
C ⁰⁺	668.6Å	21028.7Å	pec93#c_pjr#c0.dat
C ²⁺	2010.5Å	9862.1Å	pec96#c_vsr#c2.dat
C ²⁺	2010.5Å	9862.1Å	pec96#c_vsu#c2.dat

Information on an ADF15 file

OPEN-ADAS: pec93#c_pjr#c4.dat - Mozilla Firefox

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Freeform search

Search by wavelength

Search by ion

Search by data class

Documentation

Online codes

Download codes

About ADAS

ADF04 ADF08 ADF09 ADF11 ADF12 **ADF15** ADF40

ADF15 File: pec93#c_pjr#c4.dat

Ion: C⁴⁺
 Temperature Range: 4.31 → 4310 eV
 Density Range 78.1 → 7.81e+22 cm⁻³
 Filename: pec93#c_pjr#c4.dat
 Full Path: adf15/pec93#c/pec93#c_pjr#c4.dat
 MD5SUM: 16e89d71d557def88224eadd7bfc0da1

Download Options
[Download Data](#)
[Documentation](#)
[Software libraries](#)

Wavelength	Transition	Type	Driving Population
35Å	$1P_{1,0} \rightarrow 1S_{0,0}$	Excitation	$1S_{0,0}$
35Å	$1P_{1,0} \rightarrow 1S_{0,0}$	Excitation	$3S_{1,0}$
35Å	$1P_{1,0} \rightarrow 1S_{0,0}$	Recombination	
40.3Å	$1P_{1,0} \rightarrow 1S_{0,0}$	Excitation	$1S_{0,0}$
40.3Å	$1P_{1,0} \rightarrow 1S_{0,0}$	Excitation	$3S_{1,0}$
40.3Å	$1P_{1,0} \rightarrow 1S_{0,0}$	Recombination	
40.7Å	$3P_{4,0} \rightarrow 1S_{0,0}$	Excitation	$1S_{0,0}$

Next steps

- Documentation of code — almost none so far.
- Expansion to remaining data formats.
- Search by wavelength and freeform search.
- Review of the design aspects of the web interface.
- Preparation of software libraries, including documentation.
- Setting up a live site and specific deployment considerations.

Conclusions

- Progress so far has been quite fast and effective.
- A short report (28 pages) has been prepared.
- We think carrying on in a similar way is appropriate.
- Looking for a couple of volunteers who can:
 - try using the beta version of the website,
 - write a short summary of their findings: good and bad,
 - Probably a time commitment of 4–6 hours.
- Demo will be running on a laptop during coffee.