

Exploring and Mapping Vocabularies

IVOA InterOp Semantics Session

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Alasdair J. G. Gray

Outline

- Vocabulary Exploration
- Vocabulary Mappings
 - Why do we need them?
 - How should we express them?
 - A GUI Editor
- Open Issues

Vocabulary Explorer

- Web application

<http://explicator.dcs.gla.ac.uk/WebVocabularyExplorer>

- Uses official vocabularies
- Allows text search for vocabulary concepts
 - Displays available concept information
 - Exploration of Broader, Narrower and Related links
- Demonstrate why we need
 - Multiple vocabularies ([screenshots](#))
 - Mappings

Exploring a Vocabulary

The screenshot shows a Mozilla Firefox browser window titled "Vocabulary Explorer - Mozilla Firefox". The address bar displays the URL `http://localhost:8080/WebVocabularyExplorer/#display%3D1`. The browser's menu bar includes "File", "Edit", "View", "History", "Bookmarks", "Tools", and "Help". The toolbar contains navigation icons (back, forward, home, stop, refresh) and a search icon. The bookmark bar lists "Latest Headlines", "Glasgow University", "Explicator", "Standards Bodies", "GMail", "Scotrail", "DBLP", "Conferences, etc", "Feeds", and "SPARQLer".

The main content area features a dark grey header with the text "VOCABULARY EXPLORER" in white. Below the header is a search interface with a text input field containing "lensing", a "search" button, and a "Vocabularies" button. To the right of the search results, it says "Results 1 - 1 of 1 for 'lensing'". A single result is displayed in a box with a right-pointing triangle and the text "Gravitational lensing".

At the bottom of the main content area, a dark grey footer contains the text "Developed as part of the [Explicator](#) project".

The browser's status bar at the bottom shows "Done" on the left and "Open Notebook" on the right.

Exploring a Vocabulary

Vocabulary Explorer - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://localhost:8080/WebVocabularyExplorer/#display%3D1

Latest Headlines Glasgow University Explicator Standards Bodies Gmail Scotrail DBLP Conferences, etc Feeds SPARQLer

VOCABULARY EXPLORER

lensing search Vocabularies

Results 1 - 1 of 1 for "lensing"

▼ [Gravitational lensing](#)

Vocabulary

- Vocabulary for Astronomy & Astrophysics Journal keywords (Version 1.0)

Broader Terms

- [Physical data and processes](#)

Developed as part of the [Explicator](#) project

Done Open Notebook

Exploring a Vocabulary

Vocabulary Explorer - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://localhost:8080/WebVocabularyExplorer/#browse%3Dhttp%3A%2F%2Fwww.ivoa.net%2FDocument

Latest Headlines Glasgow University Explicator Standards Bodies Gmail Scotrail DBLP Conferences, etc Feeds SPARQLer

VOCABULARY EXPLORER

lensing search Vocabularies

PHYSICAL DATA AND PROCESSES

Vocabulary

- Vocabulary for Astronomy & Astrophysics Journal keywords (Version 1.0)

Narrower Terms

- [Acceleration of particles](#)
- [Accretion, accretion disks](#)
- [Astrobiology](#)
- [Astrochemistry](#)
- [Atomic data](#)
- [Atomic processes](#)
- [Black hole physics](#)
- [Chaos](#)
- [Conduction](#)
- [Convection](#)
- [Dense matter](#)
- [Diffusion](#)
- [Elementary particles](#)
- [Equation of state](#)
- [Gravitation](#)
- [Gravitational lensing](#)
- [Gravitational waves](#)
- [Hydrodynamics](#)
- [Instabilities](#)
- [Line formation](#)

Done Open Notebook

Exploring a Vocabulary

- Small number of results
 - Could be none
 - Can lead to frustration
- What if we explore all the vocabularies?
([Screenshots](#))

Exploring Vocabularies

The screenshot shows a Mozilla Firefox browser window titled "Vocabulary Explorer - Mozilla Firefox". The address bar displays the URL `http://localhost:8080/WebVocabularyExplorer/#display%3D1`. The browser's menu bar includes "File", "Edit", "View", "History", "Bookmarks", "Tools", and "Help". The browser's toolbar contains navigation icons and a search box with the text "Google". The browser's status bar shows several bookmarks: "Latest Headlines", "Glasgow University", "Explicator", "Standards Bodies", "GMail", "Scotrail", "DBLP", "Conferences, etc", "Feeds", and "SPARQLer".

The main content area of the browser displays the "VOCABULARY EXPLORER" application. At the top, there is a search bar containing the text "lensing" and a "search" button. To the right of the search bar is a "Vocabularies" button. Below the search bar, the text "Results 1 - 10 of 16 for 'lensing'" is displayed. The search results are presented in a list format:

- ▶ [gravitational lensing](#)
- ▼ [Cosmology: Phenomenon: Lensing](#)
 - Alternative Labels**
 - 6.2.1 Lensing
 - Vocabulary**
 - ◆ The list of AOIM keywords in VOcabulary format (Version 1.0)
 - Broader Terms**
 - ◆ [Cosmology](#)
- ▶ [gravitational lensing shear](#)
- ▶ [gravitationally lensed source](#)
- ▶ [strong gravitational lensing](#)
- ▶ [weak gravitational lensing](#)

The browser's status bar at the bottom shows "Done" on the left and "Open Notebook" on the right.

Exploring Vocabularies

The screenshot shows a Mozilla Firefox browser window titled "Vocabulary Explorer - Mozilla Firefox". The address bar displays the URL: `http://localhost:8080/WebVocabularyExplorer/#browse%3Dhttp%3A%2F%2Fwww.ivoa.net%2FDocument`. The browser's menu bar includes "File", "Edit", "View", "History", "Bookmarks", "Tools", and "Help". The browser's toolbar shows navigation buttons (back, forward, home, stop, refresh) and a search box with "Google" entered. The browser's status bar at the bottom shows "Done" and "Open Notebook".

The main content area of the browser displays the "VOCABULARY EXPLORER" application. At the top, the word "VOCABULARY EXPLORER" is written in a large, serif font. Below this, there is a search bar containing the text "lensing" and a "search" button. To the right of the search bar is a "Vocabularies" button. The search results are displayed in a white box with a grey border. The results are organized into sections:

- COSMOLOGY**
- Alternative Labels**
 - 6 Cosmology
- Vocabulary**
 - The list of AOIM keywords in VOcabulary format (Version 1.0)
- Narrower Terms**
 - [Cosmology: Morphology: Cosmic Background](#)
 - [Cosmology: Morphology: Deep Field](#)
 - [Cosmology: Morphology: Large-Scale Structure](#)
 - [Cosmology: Phenomenon: Dark Matter](#)
 - [Cosmology: Phenomenon: Gamma Ray Burst](#)
 - [Cosmology: Phenomenon: Lensing](#)

At the bottom of the application, a footer reads: "Developed as part of the [Explicator](#) project".

Exploring Vocabularies

The screenshot shows a Mozilla Firefox browser window titled "Vocabulary Explorer - Mozilla Firefox". The address bar displays "http://localhost:8080/WebVocabularyExplorer/#display%3D11". The browser's bookmark bar includes "Latest Headlines", "Glasgow University", "Explicator", "Standards Bodies", "GMail", "Scotrail", "DBLP", "Conferences, etc", "Feeds", and "SPARQLer".

The main content area features a header "VOCABULARY EXPLORER" in a dark grey bar. Below the header, there is a search input field containing "lensing", a "search" button, and a "Vocabularies" button. To the right of the search area, it says "Results 11 - 16 of 16 for 'lensing'".

The search results are displayed in a list format:

- ▼ [Gravitational lensing](#)
 - Vocabulary**
 - Vocabulary for Astronomy & Astrophysics Journal keywords (Version 1.0)
 - Broader Terms**
 - [Physical data and processes](#)
- ▶ [CAMERA LENSES](#)
- ▶ [WIDE ANGLE LENSES](#)
- ▶ [FIELD CORRECTORS](#)
- ▶ [luminous arc](#)
- ▶ [gravitational lens](#)

At the bottom of the results list, there are navigation links: [Previous](#), [1](#), and [2](#).

The footer of the page states: "Developed as part of the [Explicator](#) project".

The browser's status bar at the bottom shows "Done" and "Open Notebook".

Exploring Vocabularies

- Get more search results
 - Results from different vocabularies
- Exploration “locks” you into a vocabulary
 - No additional links to concepts in other vocabularies
- What if we have mappings?
 - What is a mapping?
 - How can they be expressed?

What is a Mapping?

“A relationship from a concept in one vocabulary to a concept in another vocabulary.”

- Types of mapping:
 - The same concept
 - A more general/broader concept
 - A more specific/narrower concept
 - A related concept
 - Others? Similar, synonym, ...

Using broader/narrower/related

- Conceptual mismatch
 - Leads to inconsistencies
- No “*these things are the same*” relationship

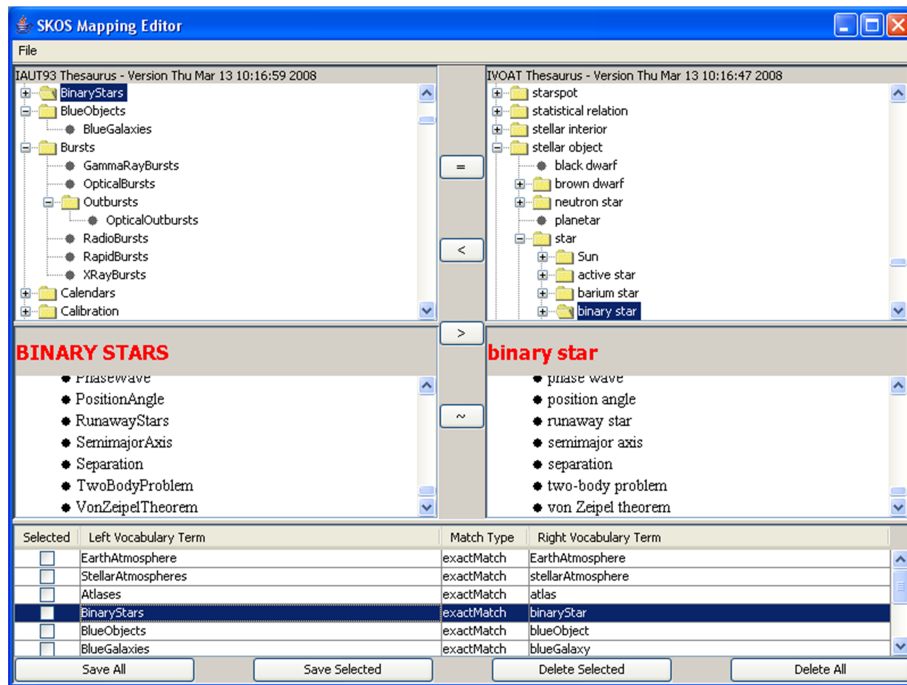
```
aaKeys:sunspot
  a skos:concept ;
...
skos:narrower aaKeys:sun ;
skos:narrower aoim:starspot ;
...
```

```
aoim:starspot
  a skos:concept ;
...
skos:narrower aoim:star ;
ex:sameAs aaKeys:sunspot ;
...
```

Separate Mapping Terms

- Currently four mapping relationships:
 - `skos:exactMatch`
 - `skos:broader`
 - `skos:narrower`
 - `skos:related`
- Inverse mappings
- Declared in separate file
 - Good practice
 - Use vocabulary independently of mappings
 - Declare in one direction

Generating Mappings



- Choose 2 vocabularies
- Choose concepts
- Click type of mapping
- Save mappings to file

Mapping File

[Appropriate prefix declarations]

<>

```
dc:creator "Alasdair J G Gray"@en;  
dc:created "2008-02-07";  
dc:title "Mappings from Astronomy &  
Astrophysics Journal keywords to the AOIM  
taxonomy"@en .
```

```
aaKeys:AccretionAccretionDisks skos:exactMatch  
  aaim:StarCircumstellarMaterialDiskAccretion .
```

```
aaKeys:BlackHolePhysics skos:relatedMatch  
  aaim:StarEvolutionaryStageBlackHole ,  
  aaim:GalaxyComponentCentralBlackHole .
```

```
aaKeys:GravitationalLensing skos:exactMatch  
  aaim:GalaxyTypeGravitationallyLensed ;  
skos:relatedMatch  
  aaim:CosmologyPhenomenonLensing .
```

- Require metadata
 - dc terms
 - Our own
- What do we require?
 - Creator
 - Vocabularies
 - Versions
 - Date
 - ?

Exploring Using Mappings

Vocabulary Explorer - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://explicator.dcs.gla.ac.uk/WebVocabularyExplorer/#display%3D1

Latest Headlines Glasgow University Explicator Standards Bodies Gmail Scotrail DBLP Conferences, etc Feeds SPARQLer

lensing search Vocabularies

Results 1 - 10 of 16 for "lensing"

▶ [gravitational lensing](#)

▼ [Cosmology. Phenomenon: Lensing](#)

Alternative Labels

6.2.1 Lensing

Vocabulary

- The list of AOIM keywords in VOcabulary format (Version 1.0)

Broader Terms

- [Cosmology](#)

Related Terms

- [Gravitational lensing](#)

▶ [gravitational lensing shear](#)

▶ [gravitationally lensed source](#)

▶ [strong gravitational lensing](#)

Done Open Notebook

Exploring Using Mappings

Vocabulary Explorer - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://explicator.dcs.gla.ac.uk/WebVocabularyExplorer/#browse%3Dhttp%3A%2F%2Fwww.ivoa.net%2F... Google

Latest Headlines Glasgow University Explicator Standards Bodies Gmail Scotrail DBLP Conferences, etc Feeds SPARQLer

VOCABULARY EXPLORER

lensing search Vocabularies

GRAVITATIONAL LENSING

Vocabulary

- Vocabulary for Astronomy & Astrophysics Journal keywords (Version 1.0)

Equivalent Concepts

- [Galaxy Type: Gravitationally Lensed](#)

Broader Terms

- [Physical data and processes](#)

Related Terms

- [Cosmology Phenomenon: Lensing](#)

Developed as part of the [Explicator](#) project

Done Open Notebook

Exploring Using Mappings

([Screenshots](#))

- Many search results
 - Require better ranking (try star)
- Discover inter vocabulary relationships
 - Jump to concepts in other vocabularies
- Require more mapping files
 - Need to be generated using domain knowledge
 - Laborious process
 - Done once used often

Conclusions

- Mappings are useful
- Mappings are different from relationships
 - Are current mappings sufficient for our needs?
 - What metadata do we require?
- Need tools to help us
 - [Basic mapping editor](#)
 - [Vocabulary Explorer](#)
- Need improved search ranking