PaNOSC tools for FAIR data handling at ELI-ALPS

Balázs Bagó

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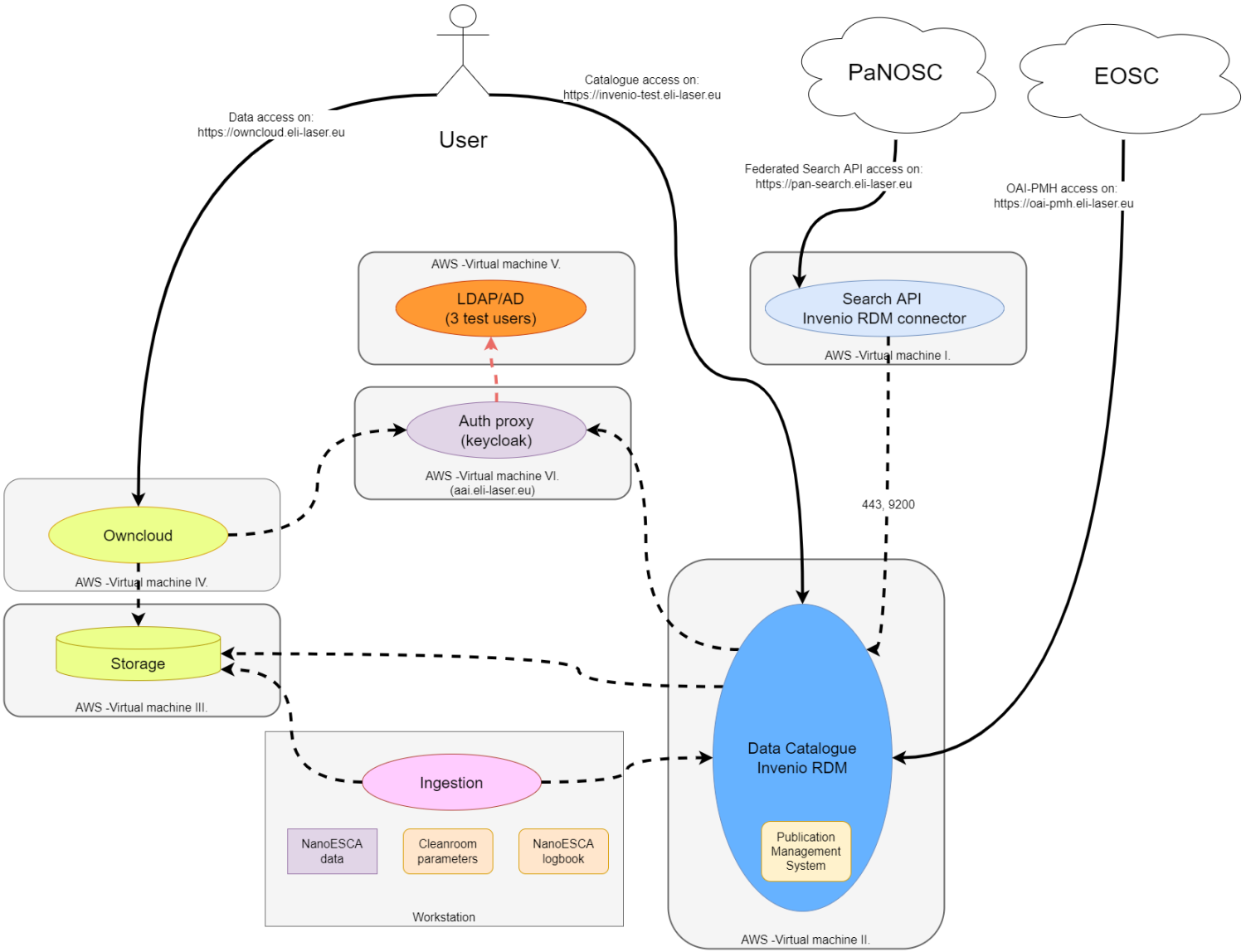
Overview

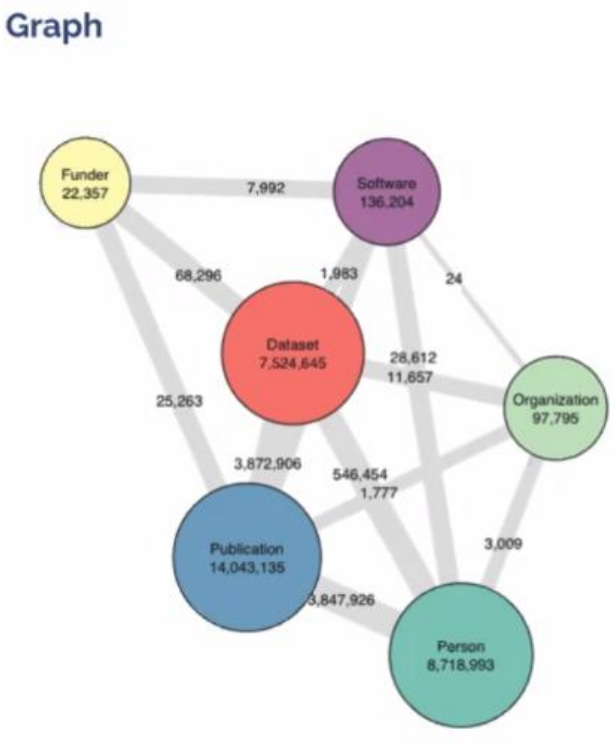
- Data pilot project
- PaNOSC Search API
  - Federated service
- NeXus Data Format
  - HDF5
  - Application definitions
  - Energy scan with NanoESCA
- Photon and Neutron Experiment Techniques (PaNET)
  - New techniques for NanoESCA

Data pilot project



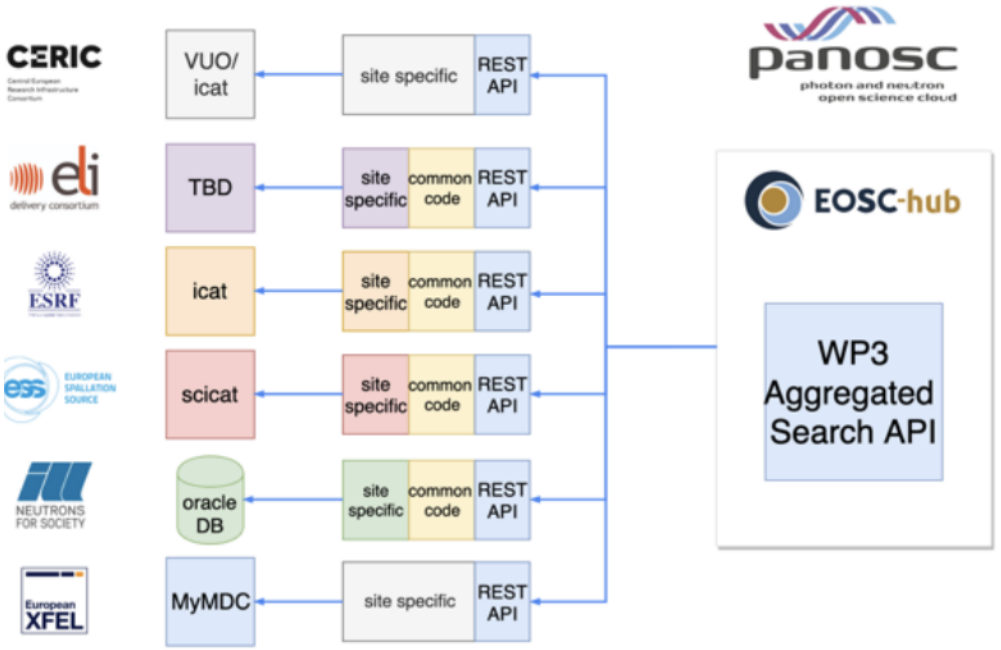
PaNOSC Search API

- Purpose of the API
- Data model
- Metadata
  - Bibliographical information
  - Domain specific information
- Persistent identifiers (PID)
  - DOI (publications, data)
  - ORCID (researchers)
  - ROR (Institutes)



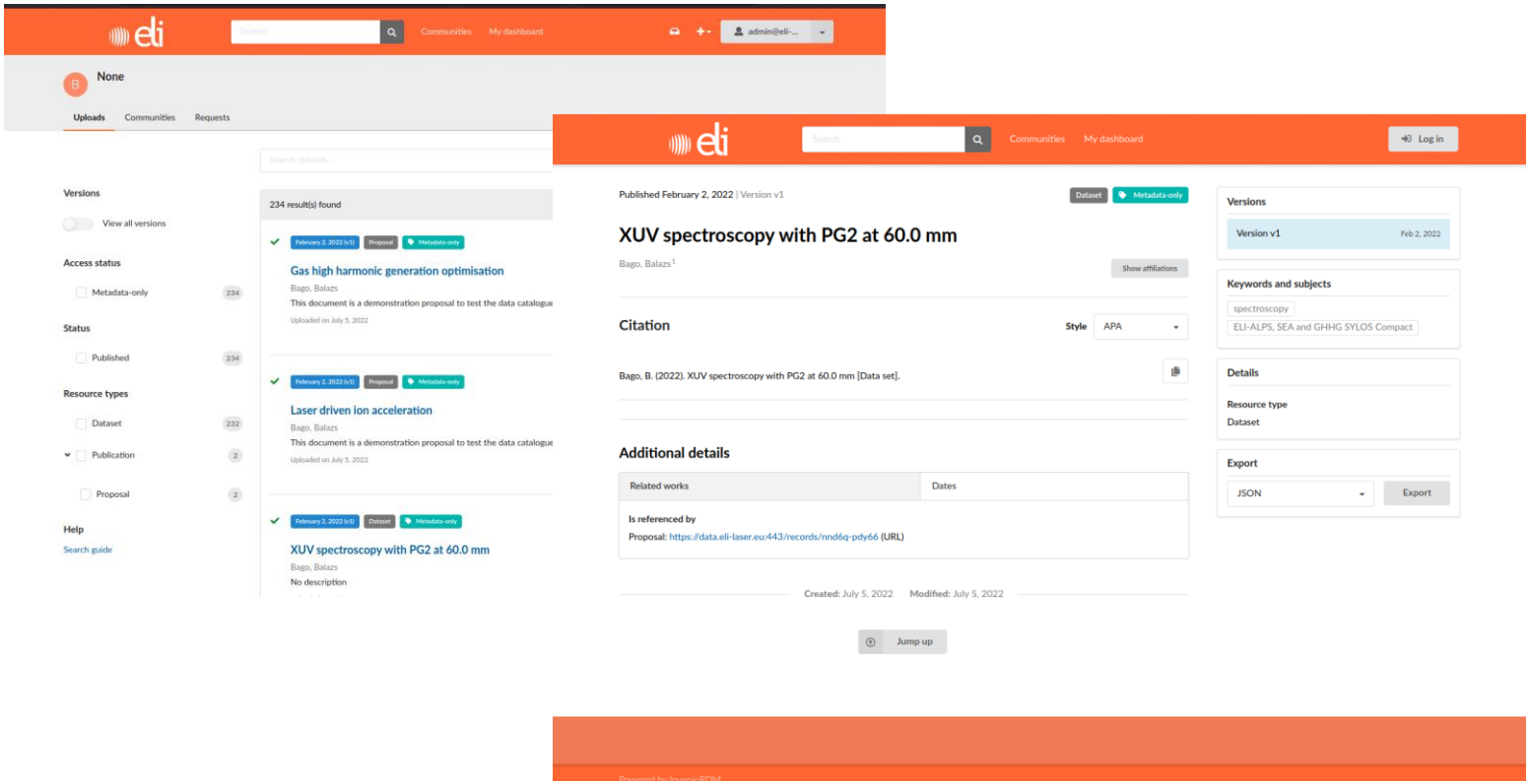
Federated Service I.

- Local API providers
- Federated API



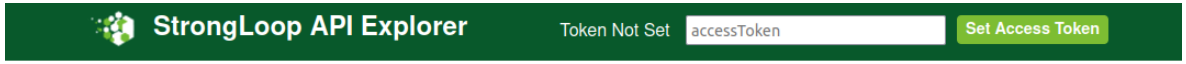
Federated Service II.

- ELI provider – Invenio RDM



Federated Service III.

- **Federated portal**



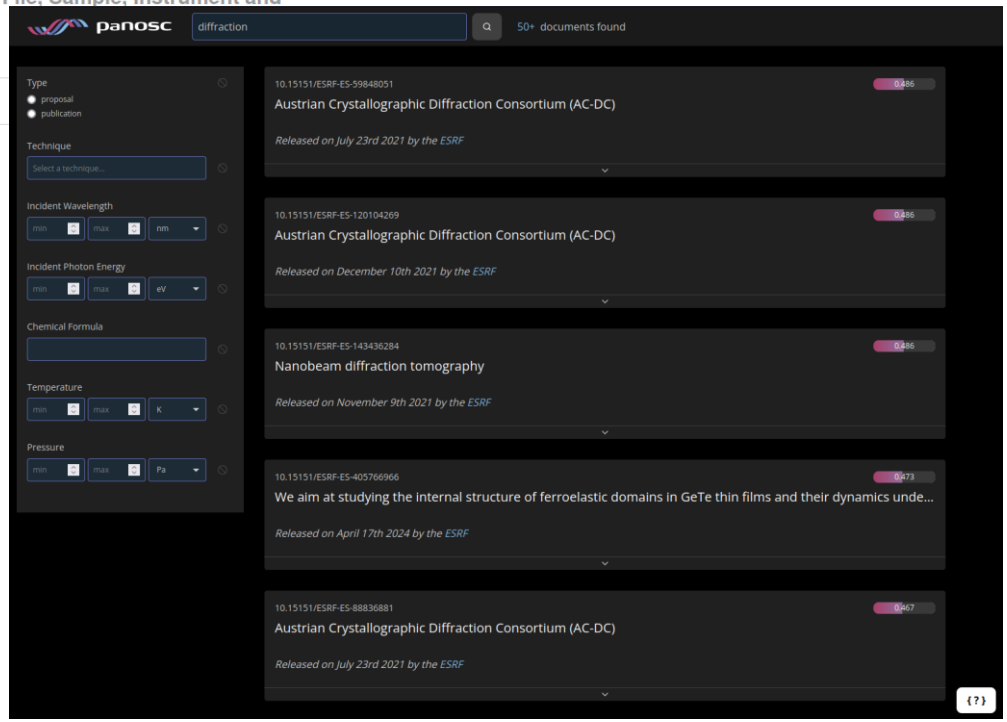
panosc-federated-search-api

Dataset : Information about an experimental run, including optional File, Sample, Instrument and Technique.

Document : Represents a scientific proposal or publication.

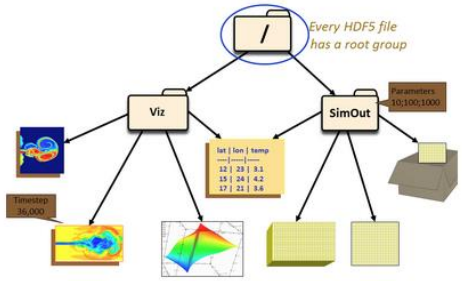
Instrument : Beam line where experiment took place.

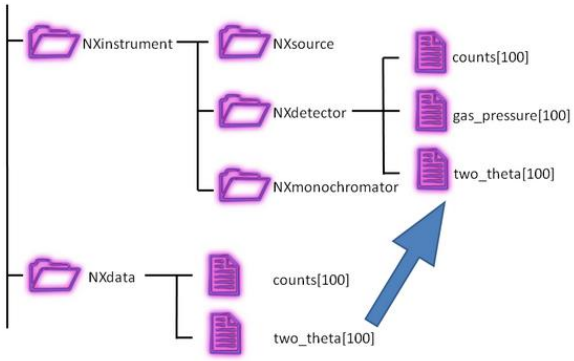
[BASE URL: /api , API VERSION: 1.0.0]



NeXus Data Format

- Common data exchange format
- HDF5
- Structured hierarchical data
  - Groups; Fields; Attributes; Links





NeXus – Application definitions

- Standardization
- Application definitions
  - Base classes
  - NXDL files
  - NeXus International Advisory Committee (NIAC)

```
<definition name="NX__template__" extends="NXobject" type="group"
    category="application"
    xmlns="http://definition.nexusformat.org/nxdl/3.1"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://definition.nexusformat.org/nxdl/3.1 ../nxdl.xsd"
    >
    <doc>template for a NXDL application definition</doc>
</definition>
```

NXdirecttof
: This is a application definition for raw data from a direct geometry TOF spectrometer

NXfluo
: This is an application definition for raw data from an X-ray fluorescence experiment

NXindirecttof
: This is a application definition for raw data from a direct geometry TOF spectrometer

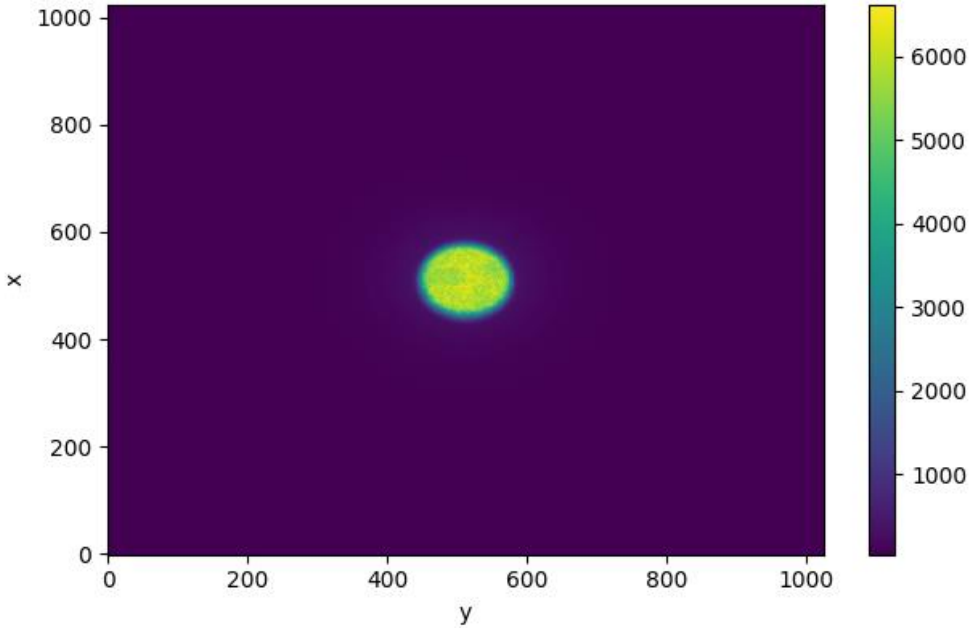
NXiqproc
: Application definition for any $I(Q)$ data.

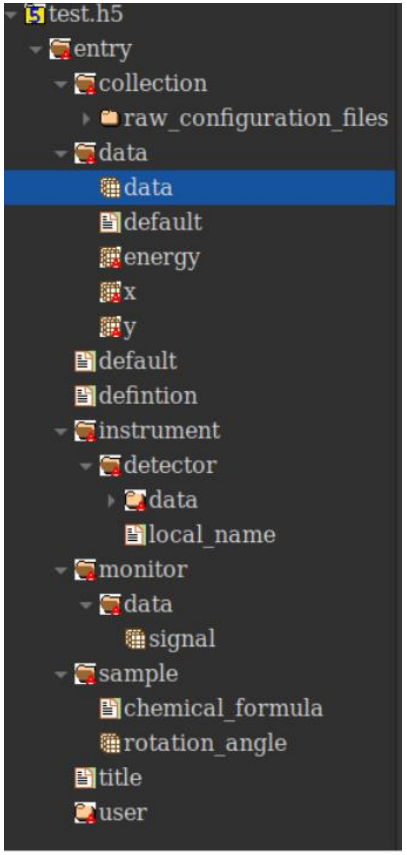
NXlauetof
: This is the application definition for a TOF laue diffractometer

NXmonopd
: Monochromatic Neutron and X-Ray Powder diffractometer

NeXus – Kinetic energy scan

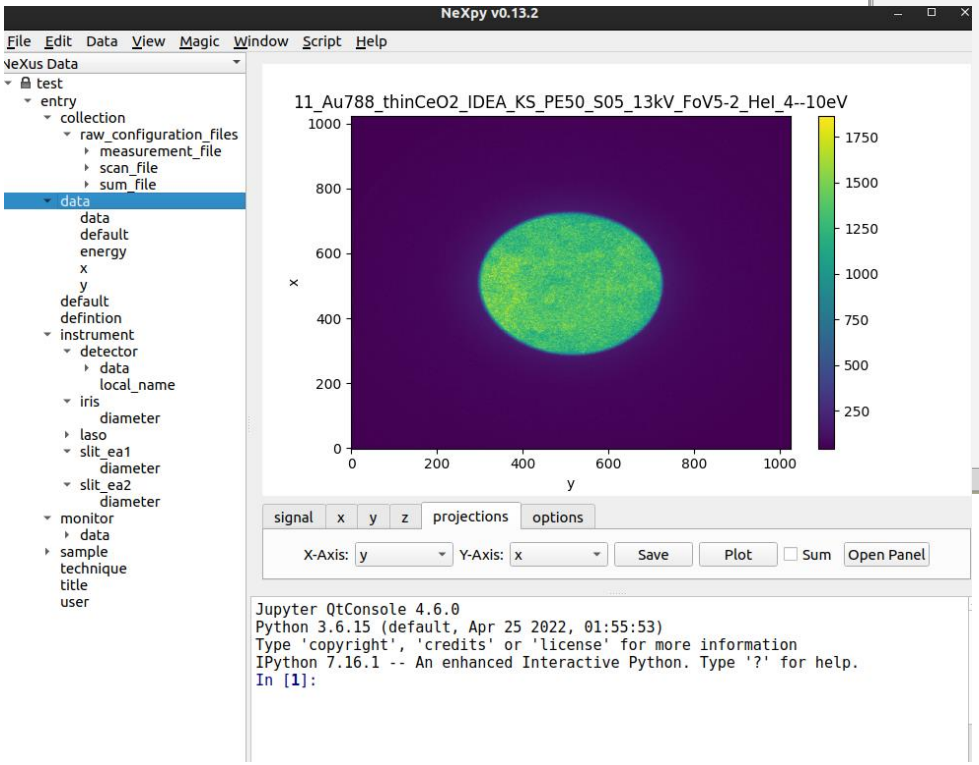
- NanoESCA
  - IDEA Mode kinetic energy scan
- Configuration ASCII files and TIFF images
- NXscan

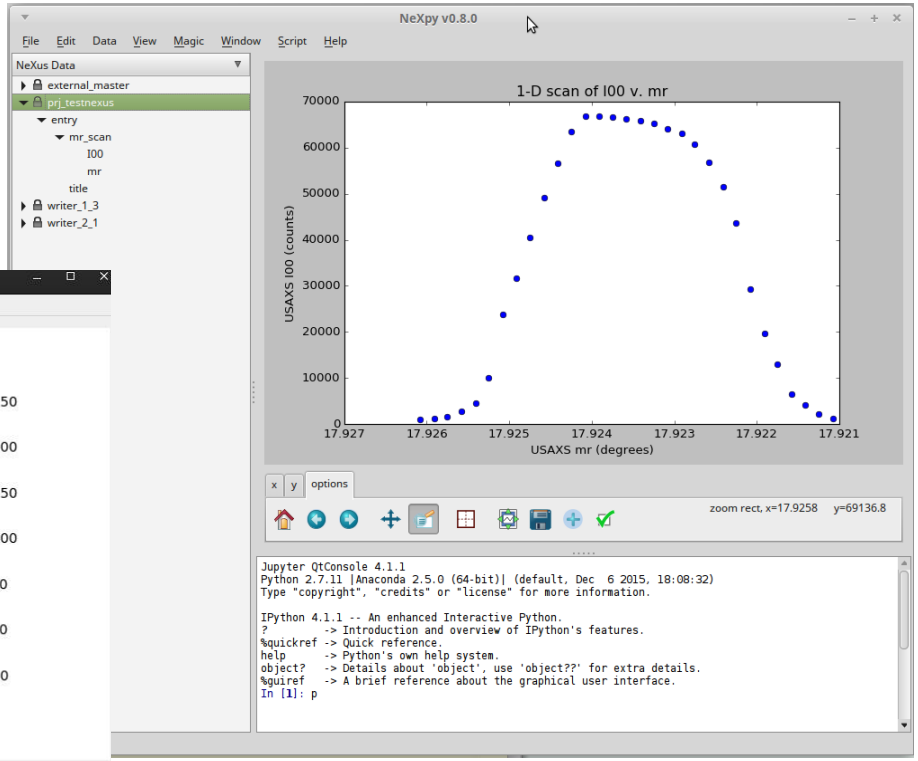




NeXus – NeXpy

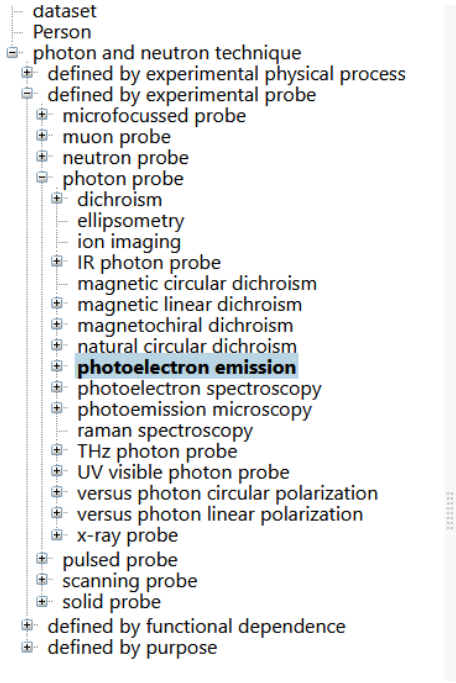
- GUI tool

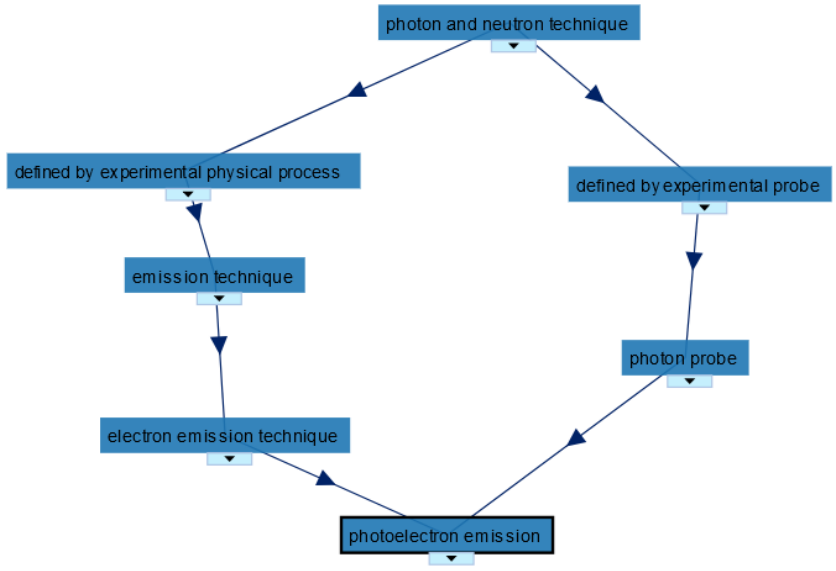




Photon and Neutron Experiment Techniques (PaNET)

- Ontology for photon and neutron science
- Graph structure
- Name; Definition; Alternative names; PID



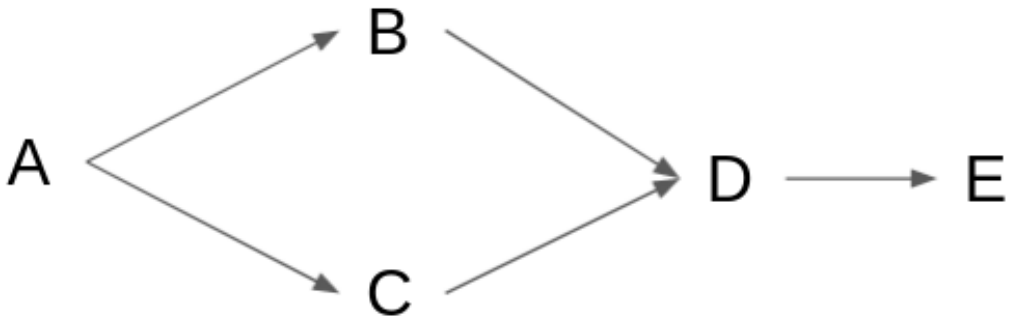


PaNET - New techniques

- Expandable
- NanoESCA existing techniques
  - PEEM
  - Photoemission spectroscopy
- NanoESCA – sub-graph
  - Spectro-microscopy
    - …
      - Momentum microscope

PaNET - Tags and search

- Descendants in the graph
- Querying a "general" term
  - B -> B, D and E
  - D -> E



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