

Federated services accessible through the 'PaN portal'

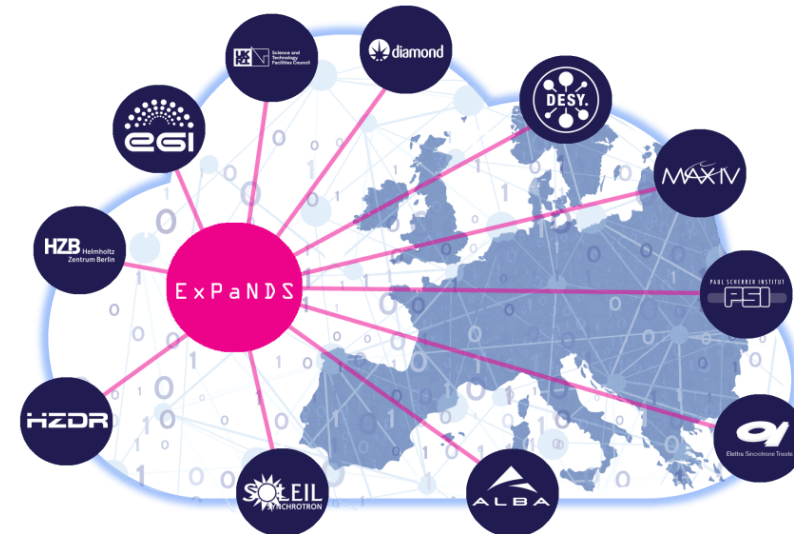
Alun Ashton, PSI

2nd November 2020

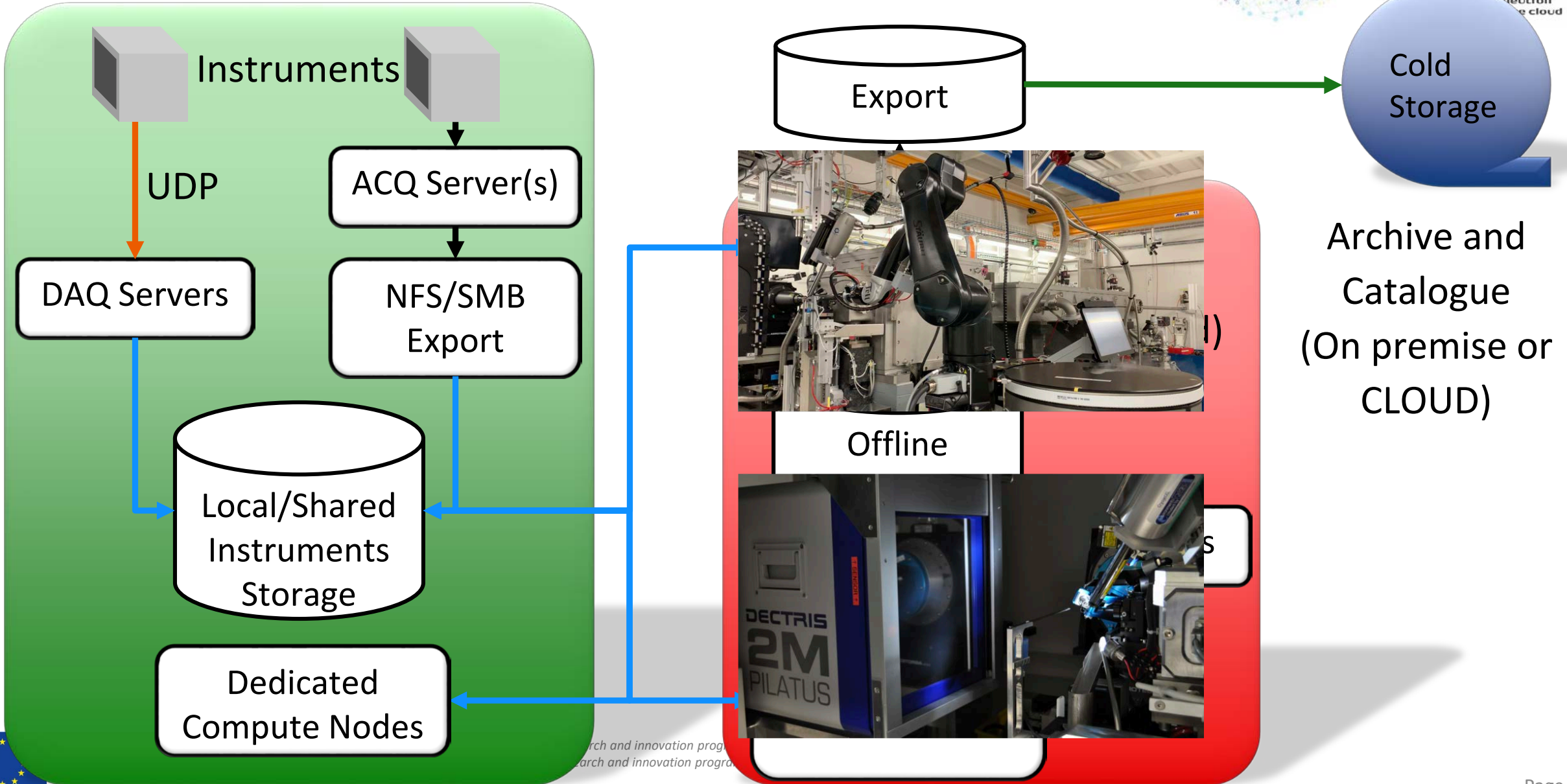


How do PaN facilities work?

1. **User:** has an idea / need to study a sample
2. **Proposal:** User writes a proposal for one or more of the PaN facilities
3. **Review :** Proposals reviewed for feasibility and scientific quality
4. **Experiment time allocated:** User travels to facility / sends sample
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6. **Analysis:** Data is reduced, analysed + curated (DOI)
7. **Publication:** User publishes results (DOI) in peer review journal



Typical PaN Facility Infrastructure

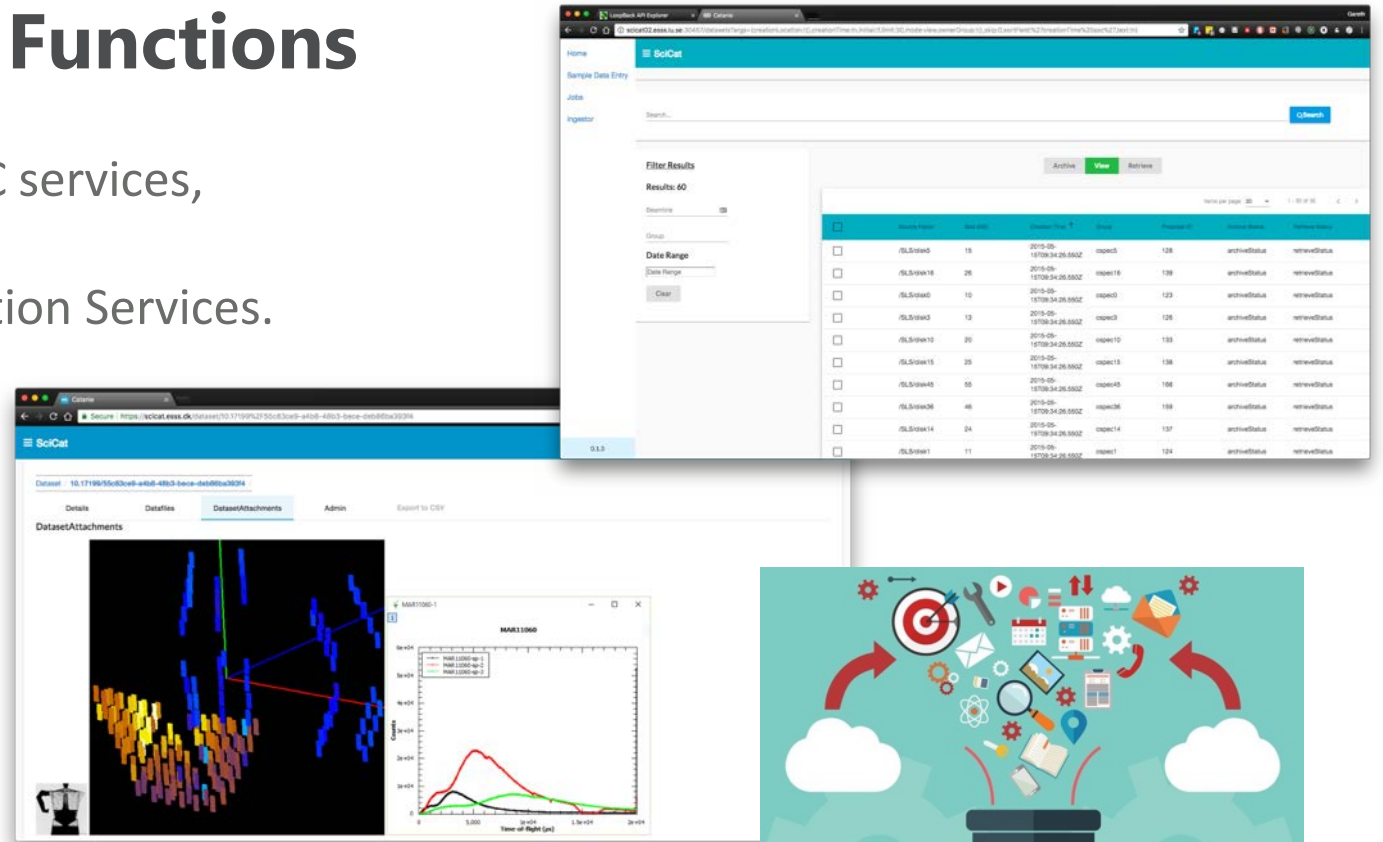


Data Catalogues – Common Functions

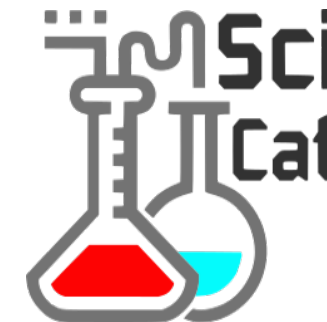
- Catalogues are an entry point to other EOSC services, often provided by the facilities, like Download, Processing, Analysis or Visualisation Services.
- Store reference to raw data and the relevant metadata to identify interesting dataset to work with.

Information available often includes:

- Proposal Information
 - Sample Information
 - Experimental Parameters
 - Previews
 - Provenance
 - Relationship to derived datasets
 - Relationship to people
- Catalogues also Facilitate Data Re-Use, Sharing and Publication via PIDs and DOIs.



Petabyte archive and Data Catalogue discovery.psi.ch



← → ↻ 🔒 discovery.psi.ch/anonymous/about



← → ↻ 🔒 doi.psi.ch

PSI Public Data Repository

[Anonymous / About /](#)

About SciCat

SciCat is a metadata catalog. At PSI, SciCat works with a PetaByte archive and remote access systems. Components provide users with the ability to securely access their data. SciCat is an open source project with ESS and Max IV.

- [SciCat Github Project.](#)

Access Conditions

Access to SciCat is granted to users by the Digital Library of Matter.

Terms of Use

The Swiss National Science Foundation describes its guidelines on [Open Research Data.](#)

Additionally, PSI defines its own [Data Policy.](#)

Public Data Repository Dashboard

ARPES data linked to the publication N.B.M. Schröter et al., Science aaz3480 (2020)
Registered Time: Tue May 05 2020 14:38:00 GMT+0200 (Central European Summer Time)
Publisher: PSI

Micrometer-resolution X-ray tomographic imaging of a complete intact post mortem...
Registered Time: Mon Feb 03 2020 09:44:00 GMT+0100 (Central European Standard Time)
Publisher: PSI

JUNGFRAU detector for brighter X-ray sources - solutions for IT and data science ...
Registered Time: Wed May 27 2020 11:29:00 GMT+0200 (Central European Summer Time)
Publisher: PSI

Visualization of stacking faults in InSb micropillars by ptychographic topography
Registered Time: Wed May 27 2020 11:29:00 GMT+0200 (Central European Summer Time)
Publisher: PSI

Selection of representative datasets for data compression investigations
Registered Time: Wed May 27 2020 08:55:00 GMT+0200 (Central European Summer Time)
Publisher: PSI

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Items per page: 25 1 - 23 of 23

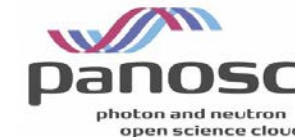
Size	Start Time	Type	Proposal ID	Group	Data Status
3 GB	2019-07-29 Mon 12:14	derived		p16628	📄 retrievable
1 GB	2019-05-08 Wed 21:11	raw	unknown	p15869	📄 retrievable
4 GB	2019-05-06 Mon 20:13	raw		a-35293	📄 retrievable
2 GB	2019-02-25 Mon 18:23	derived		p16628	📄 retrievable
1 TB	2019-02-25 Mon 18:23	derived		p16628	📄 retrievable
10 GB	2018-12-02 Sun 14:34	raw	0.11935/2018	p17301	📄 retrievable
1 GB	2018-12-02 Sun 14:34	raw	0.11935/2018	p17301	📄 retrievable
2 GB	2018-11-30 Fri 11:52	raw	0.11935/2018	p17301	📄 retrievable
1 GB	2018-11-30 Fri 11:52	raw	0.11935/2018	p17301	📄 retrievable
1 GB	2018-11-14 Wed 08:51	raw	0.11935/2018	p17301	📄 retrievable
9 GB	2018-10-04 Thu 22:57	raw		p16371	📄 retrievable
1 GB	2018-09-19	raw	unknown	p15869	📄 retrievable

PaN Data Lifecycle

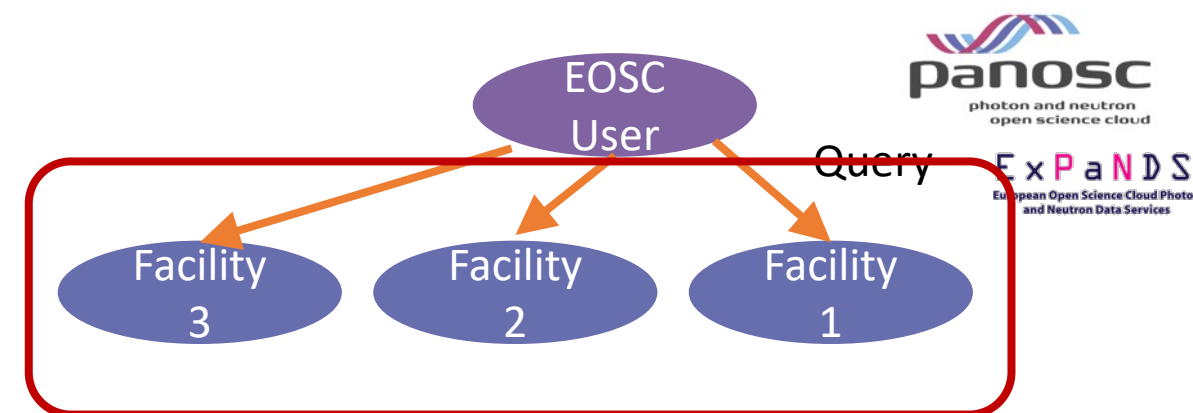
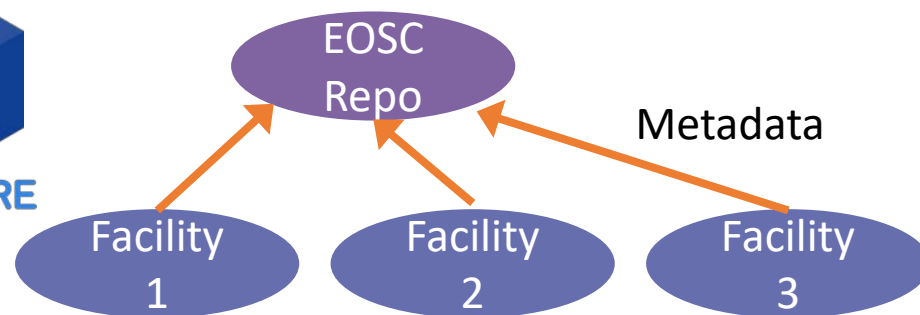


The ExPaNDS project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 857641. The PaNOSC project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 823852.

Two Routes for Opening Datasets as Federated Services



	Harvesting
Exposure Method	Push Metadata resides in third party EOSC repository
Time to Market	Quick (existing solution)
Data under embargo	Cannot be exposed
Richness of Metadata	Common Schema (Dublin Core initially)
Target User Group	Citizen Scientists, Interdisciplinary Science Community



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Data Search API Service (Query Transmitter and Aggregation)

Abstraction

Common REST API Layer

Common REST API Layer

Common REST API Layer

Common Adapter Interface Layer

Common Adapter Interface Layer

Common Adapter Interface Layer

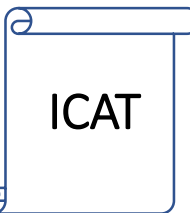
ICAT Site API

SciCat Site API

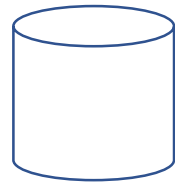
Custom Site API

PaN Facilities

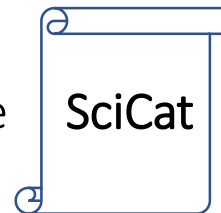
Catalogue Service



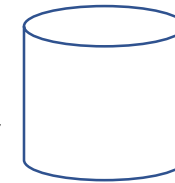
Data Repository



Catalogue Service



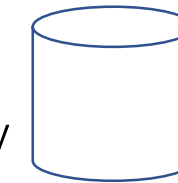
Data Repository



Catalogue Service

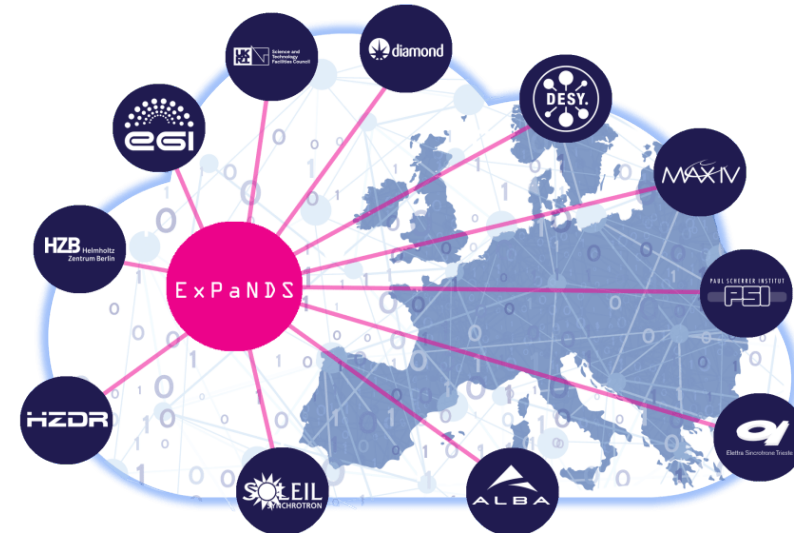


Data Repository

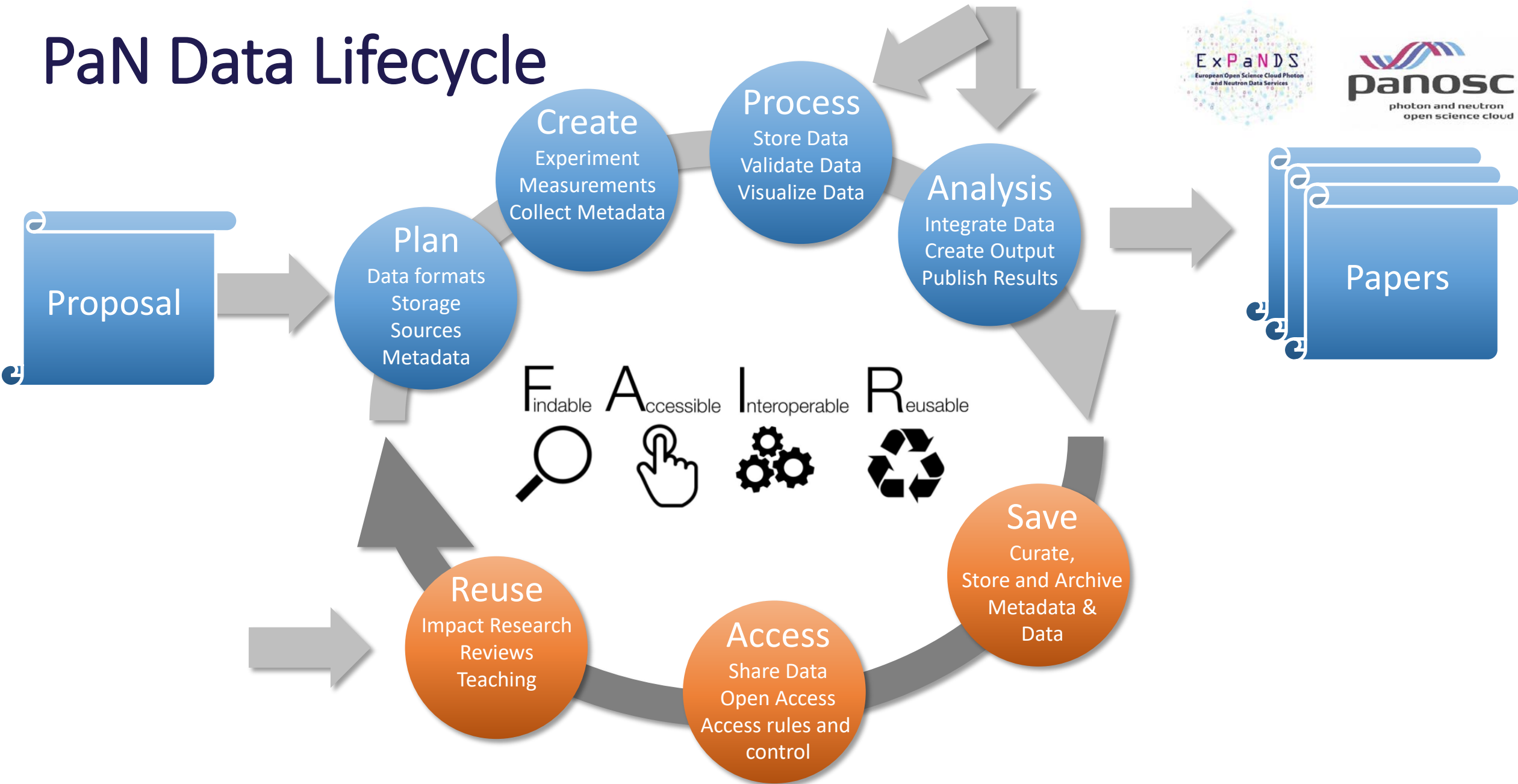


How do PaN facilities work?

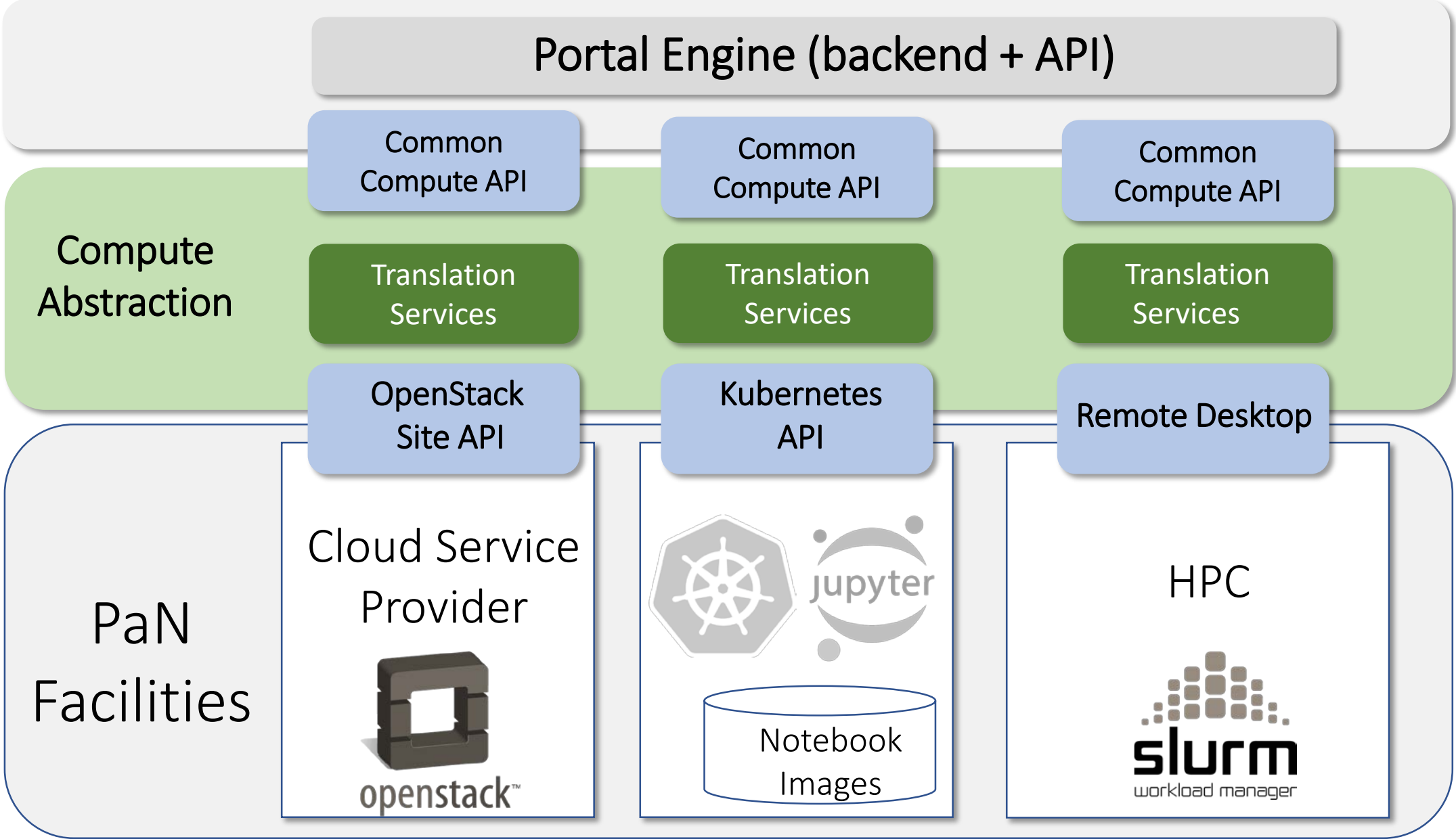
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Portal Engine (backend + API)

Compute Abstraction

Common Compute API

Common Compute API

Common Compute API

Translation Services

Translation Services

Translation Services

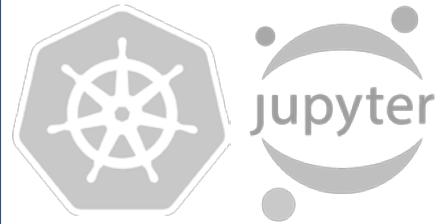
OpenStack Site API

Kubernetes API

Remote Desktop

PaN Facilities

Cloud Service Provider



Notebook Images

HPC



The Goal

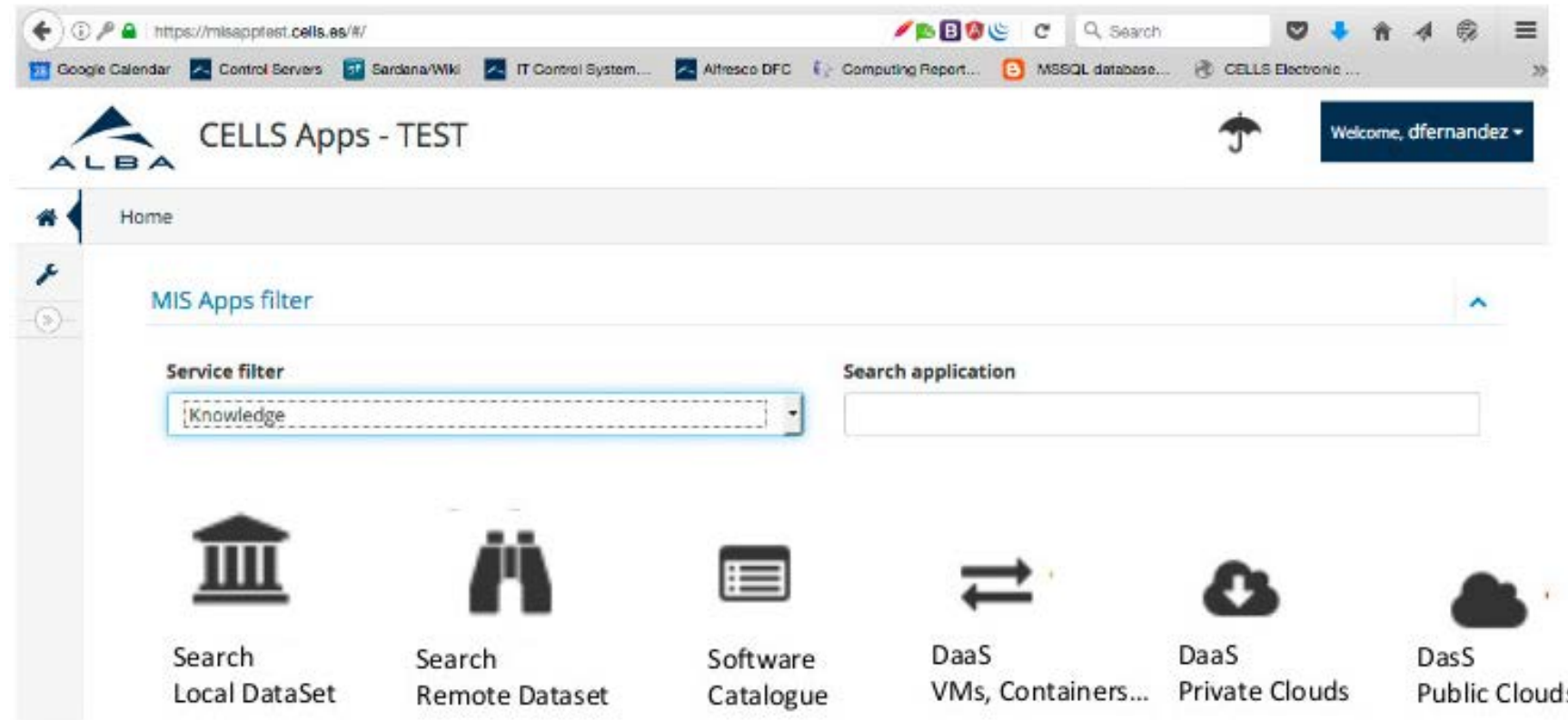


Design and Implement Prototype for DaaS Platform Portal



JRA2

Demonstrator of a Photon Science Analysis Service



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Federated services accessible through the 'PaN portal'

- ExPaNDS/PaNOSC and CALIPSOplus Technical Coordination Workshop <https://indico.cells.es/event/249/>

The screenshot displays the PaNOSC portal interface. On the left, there is a search bar and a list of techniques including Reflectometry, Spectroscopy, Phase Contrast imaging, Soft diffraction, Scattering, UV VUV spectroscopy, Photoemission microscopy, Polarised reflectivity, Microfluorescence, Gamma spectroscopy, Three-axis spectrometers, X-ray excited optical luminescence, and Diffraction imaging. The main area shows a list of services with details for each:

- Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas**
Type: Publication
Licence / Visibility: MIT / Public
Started on: 03/10/2020
Ended on: 03/10/2020
Released on: 03/10/2020
Description: Relativistic mirrors can be realized with strongly nonlinear Langmuir waves excited by intense laser pulses in underdense plasma. On reflection from the relativistic mirror the incident light affects the mirror motion. The corresponding recoil effects are investigated analytically and with particle-in-cell simulations. It is found that if the fluence of the incident electromagnetic wave exceeds a certain threshold, the relativistic mirror undergoes a significant back reaction and splits into multiple electron layers. The reflection coefficient...
Dmitr Valenta, (2020), Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas, DOI:10.1142/S0217751x19430163
Reflectometry
- Laser-Driven Proton Acceleration from Cryogenic Hydrogen Target**
Type: Proposal
Licence / Visibility: MIT / Public
Started on: 09/11/2017
Ended on: 03/21/2019
Released on: 01/01/2020
Description: 2D particle-in-cell simulation of the interaction of high-intensity laser pulse (parameters are relevant to L4 laser) with a cryogenic hydrogen target. Only protons with energy above 500 MeV at the end of the simulation are tracked and their position and energy are visualized. Two different groups of protons accelerated by different mechanisms can be distinguished from each other in space: Protons originated from the target interior and from the target rear side...
Dana Scully, (2020), Re-polarization of the a1t quantum plasma collector, DOI:10.9563/rlz.2015.87.012
X-ray excited optical luminescence
- Laser Produced Gamma Rays Trajectories**
Type: Proposal
Licence / Visibility: MIT / Public
Started on: 09/11/2017
Ended on: 03/21/2019
Released on: 01/01/2020
Description: An obliquely incident laser pulse pulls out electrons from a solid target during a process called "J x B heating". Some of these electrons are re-accelerated into the target while others scatter in the complex electromagnetic fields in front of it...
Dana Scully, (2020), Re-polarization of the a1t quantum plasma collector, DOI:10.9563/rlz.2015.87.012
Diffraction imaging
- Wake Wave Generation**
Type: Proposal
Licence / Visibility: MIT / Public
Started on: 09/11/2017
Ended on: 03/21/2019
Released on: 01/01/2020
Description: This simulation represents intense laser beam focused on the rear side of the plasma target. Plasma is made of two types of particles: electrons and protons. In particle-in-cell simulations, we use macro particles, where 1 macro particle represents many real particles. Here you can see only electrons, protons are not interesting in this case since their weight is much higher (and therefore they do not move). Behind the laser pulse, plasma waves are excited (density spikes moving with the group velocity of the laser beam). Under certain conditions...
Dana Scully, (2020), Re-polarization of the a1t quantum plasma collector, DOI:10.9563/rlz.2015.87.012
Soft diffraction
- Time-resolved spectroscopy - run 1-52**
Type: Proposal
Licence / Visibility: MIT / Public
Started on: 09/11/2017
Ended on: 03/21/2019
Released on: 01/01/2020
Description: RP4-SRS focuses on time-resolved spectroscopy experiments in the full range of frequencies from IR to UV. Users can measure samples as varied as solid state crystals, or proteins in their natural environment. Time-resolved spectroscopy is the collection of techniques that are used to examine the dynamic processes of materials and chemicals upon illumination with a pulsed laser...
Dana Scully, (2020), Re-polarization of the a1t quantum plasma collector, DOI:10.9563/rlz.2015.87.012
Spectroscopy
- Two-color XUV+NIR femtosecond photoionization of neon in the near-threshold region**
Type: Proposal
Licence / Visibility: MIT / Public



EXPANDS

**European Open Science Cloud Photon
and Neutron Data Services**

Thankyou

Alun Ashton

<https://expands.eu>

Thanks to: Tobias Richter
and all in CalipsoPlus/JRA2, PaNOSC and ExPaNDS WP3 and 4

