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National Initiatives for Open Science in Europe

PaNOSC - Fotonski in nevtronski oblak odprte znanosti

Aljoša Hafner, CERIC-ERIC

Mreža znanja 2020, 25. in 26. november



EVROPSKA UNIJA
EVROPSKI SKLAD ZA
REGIONALNI RAZVOJ
NALOŽBA V VAŠO PRIHODNOST

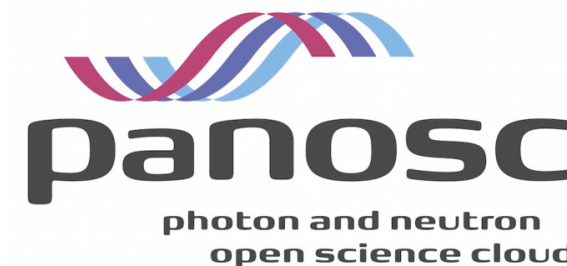


REPUBLIKA SLOVENIJA
MINISTRSTVO ZA IZOBRAŽEVANJE,
ZNANOST IN ŠPORT

Naložbo sofinancirata Republika Slovenija in Evropska unija iz Evropskega sklada za regionalni razvoj

PaNOSC

Fotonski in nevtronski oblak odprte znanosti
Photon and Neutron Open Science Cloud



Aljoša Hafner – CERIC-ERIC – aljosa.hafner@ceric-eric.eu

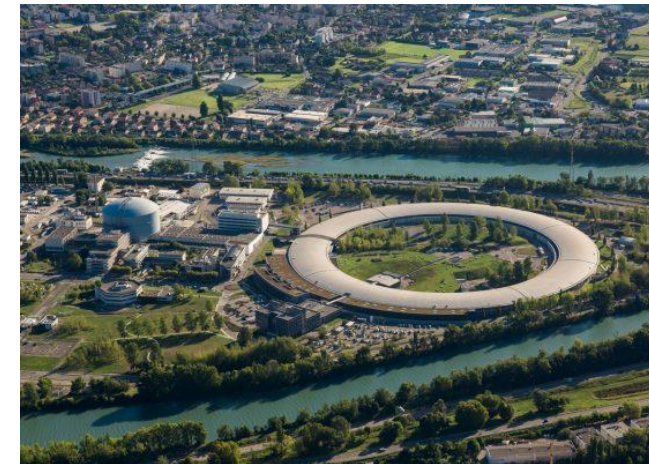
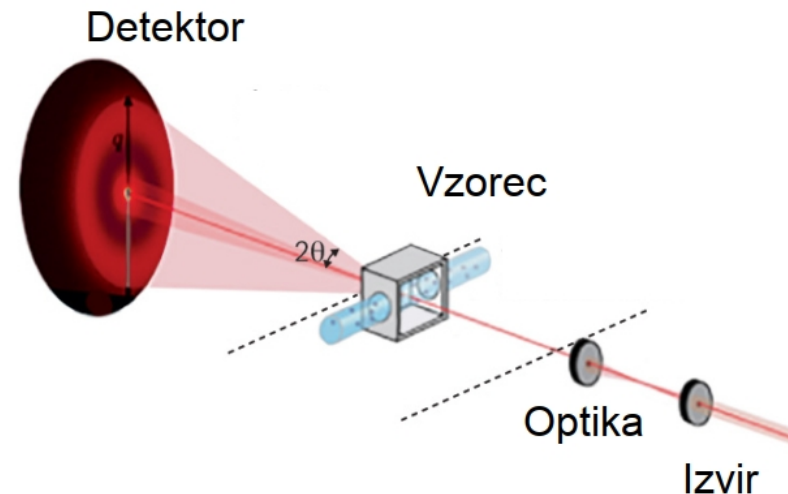
Zakaj fotonski in nevtronski izvori?

- Izviri rentgenskih žarkov (**fotonov**): sinhrotroni in laserji na proste elektrone
- Izviri **nevtronov**: reaktorji in spalacijski izviri

- Aplikacije (struktura in lastnosti snovi, časovni potek pojavov):

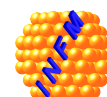
- fizika
- kemija
- biologija
- raziskave materialov
- farmacija
- arheologija
- restavratorstvo
- ...

Slike: (desno zgoraj) Sinhrotron ESRF in reaktor ILL; (desno spodaj) sinhrotron Elettra in laser na proste elektrone FERMI; (spodaj) splošna shema eksperimentov.



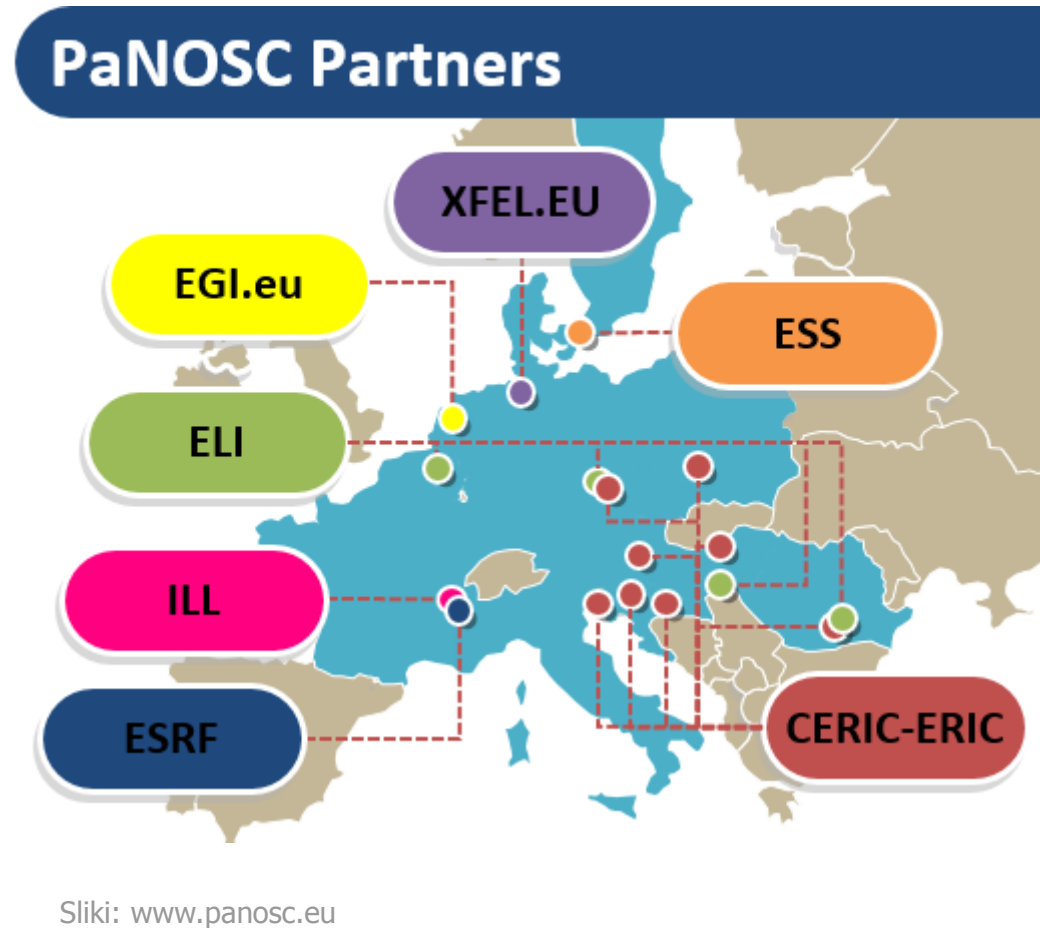
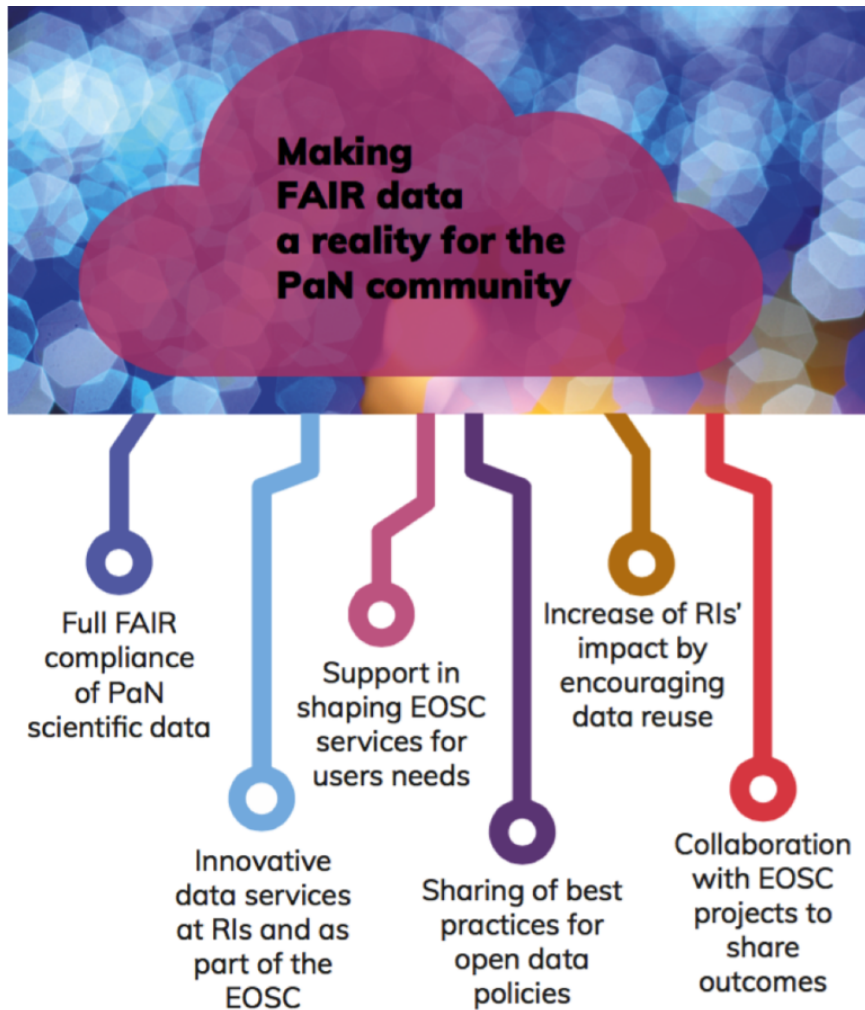
CERIC-ERIC

- Central European Research Infrastructure Consortium
- Konzorcij 8 inštitutov iz 8 držav
 - *Uporabniku dostopna* infrastruktura (user facility)
- Enotna vstopna točka za prijavo na poskuse
 - Interdisciplinarnost



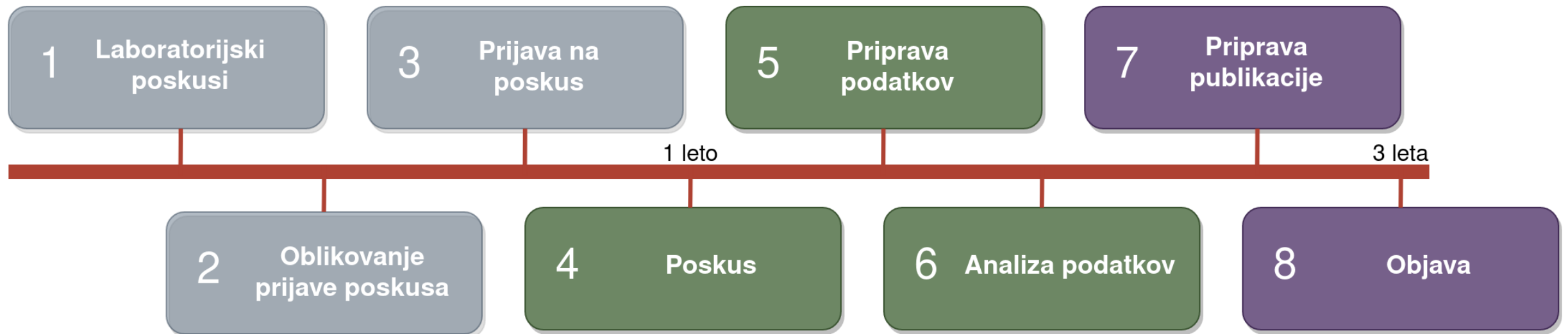
Slike: www.ceric-eric.eu

PaNOSC - struktura



Eksperimentalni proces – stanje (1)

- Tipičen potek poskusa na *uporabniku dostopni* raziskovalni ustanovi (user facility)
- Infrastruktura je prezasedena in *žarkovni čas* (beam time) je omejen
- Povprečni čas od poskusa do objave 2-3 leta

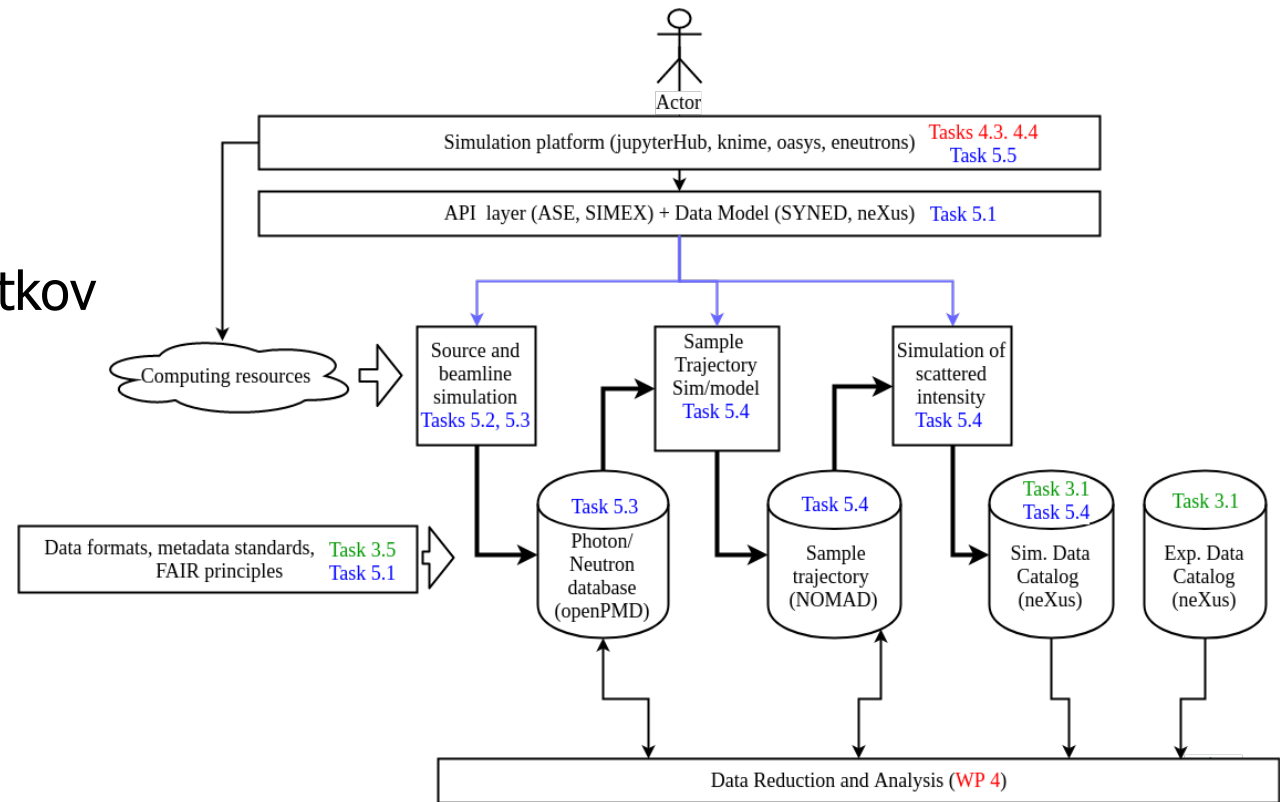


Eksperimentalni proces – stanje (2)

- Neenoten uporabniški račun
- Orodja za zajem narejena po meri
- Nestandardizirani podatkovni formati in metapodatki
 - Programska orodja za analizo in simulacije
- ▶ **Dolg čas** od poskusa do objave! Veliko poskusov **nikoli** ne obrodi objave!

Oblačno okolje – PaNOSC (1)

- 8 delovnih sklopov:
 - Administracija
 - Hranjenje in politika hranjenja podatkov
 - Podatkovni katalogi
 - Analiza podatkov
 - Simulacije
 - Integracija v EOSC
 - Trajnost – poslovni model
 - Izobraževanje




Slike: shema PaNOSC aplikacij in storitev okrog simulacij.

Oblačno okolje – PaNOSC (2)

- Enotna prijavna shema (*user ID*)
- Neposredno shranjevanje zajetih podatkov v oblak
- Podatkovni katalogi in baze
- Delovni proces s podatki v oblaku
 - Računska zmogljivost
 - Sodelovanje
 - Dostopnost

Oblačno okolje – PaNOSC – Predogled portala


PaNOSC

⚙️
👤

Filters

Data Type

Simulation 521

Experiment 2560

Derived 423

Field

X-Ray Sources 368

Plasma Physics 49

Ion Acceleration 76

Electron Acceleration 85

Material and Biomolecular Applications 122

Technique

X-ray phase contrast imaging 59

X-ray Diffraction 45

X-ray absorption spectroscopy 85

Coherent Diffractive Imaging 26

Atomic, Molecular and Optical Science 736

Soft X-ray Materials Science 48

Pulsed Radiolysis 29

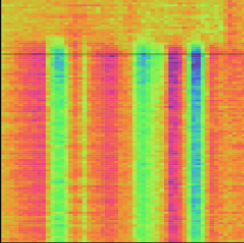
WW pump-probe 47

X-ray Phase contrast imaging 14

X-ray fluorescence 238

Absorption spectroscopy, WDM@10Hz 45

Datasets



Time-resolvent spectroscopy - run 1-52

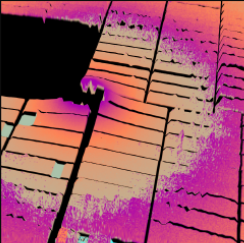
RP4-SRS focuses on time-resolvent spectroscopy experiments in the full range of frequencies from IR to UV. Users can measure samples as varied as solid state crystals, or proteins in their natural environment. Time-resolved spectroscopy is the collection of techniques that are used to examined the dynamic processes of materials and chemicals upon illumination with a pulsed laser...

Created 2019/03/15
Size 328 MB
Views 3

[Dataset](#) [X-ray Spectroscopy](#) [Pulsed Radiolysis](#) [All Tags 8](#)

[jupyterlab](#)

[launch VM](#)



Two-color XUV+NIR femtosecond photoionization of neon in the near-threshold region

RP4-SRS focuses on time-resolvent 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 examined the dynamic processes...

Created 2019/03/15
Size 7 GB
Views 3

[Dataset](#) [X-ray Spectroscopy](#) [XFEL](#)

[jupyterlab](#)

[launch VM](#)

Laser-driven Ion Acceleration from Plastic Target

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duiis dolore te feugait nulla facilisi. Fenim ad minim veniam, quis nostrud exerci tationull...

Created 2021/11/03
Size 214 GB
Views 7

[Dataset](#) [Ion Acceleration](#) [ELI Beamlines](#)

[jupyterlab](#)

[launch VM](#)

Electrons accelerated from a thin foil irradiated by an ultra-intense laser

Created 2021/11/03

PaNOSC

The Photon and Neutron Open Science Cloud (PaNOSC)

The Photon and Neutron Open Science Cloud (PaNOSC) is a European project (financed by the INFRAEOSC-04 call) for making FAIR data a reality in 6 European Research Infrastructures (RIs), developing and providing services for scientific data and connecting these to the European Open Science Cloud (EOSC).

Objectives

- Participate in the construction of the EOSC by linking with the e-infrastructures and other ESFRI clusters.
- Make scientific data produced at Europe's major Photon and Neutron sources fully compatible with the FAIR principles.
- Generalise the adoption of open data policies, standard metadata and data stewardship from 15 photon and neutron RIs and physics institutes across Europe
- Provide innovative data services to the users of these facilities locally and the scientific community at large via the European Open Science Cloud (EOSC).
- Increase the impact of RIs by ensuring data from user experiments can be used beyond the initial scope.
- Share the outcomes with the national RIs who are observers in the proposal and the community at large to promote the adoption of FAIR data principles, data stewardship and the EOSC.

[READ MORE](#)

Oblačno okolje – PaNOSC – Predogled portala

The screenshot displays the PaNOSC cloud portal interface. At the top, there is a navigation bar with a search bar and several active tabs: 'My Home', 'jupyterlab Time-resolvent spectroscopy...', and 'VM Laser-driven Ion Acceleration from...'. The main content area is divided into two columns: 'My Datasets' and 'Dashboard'.

My Datasets:

- Time-resolvent spectroscopy - run 1-52:** Created 2019/03/15, Size 328 MB, Views 3. Description: RP4-SRS focuses on time-resolvent 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 examined the dynamic processes of materials and chemicals upon illumination with a pulsed laser... Tags: Dataset, X-ray Spectroscopy, Pulsed Radiolysis, All Tags 8. Action: launch VM.
- Two-color XUV+NIR femtosecond photoionization of neon in the near-threshold region:** Created 2019/03/15, Size 7 GB, Views 3. Description: RP4-SRS focuses on time-resolvent 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 examined the dynamic processes... Tags: Dataset, X-ray Spectroscopy, XFEL. Action: launch VM.
- Laser-driven Ion Acceleration from Plastic Target:** Created 2021/11/03, Size 214 GB, Views 7. Description: Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue dui dolore te feugait nulla facilisi. Fenim ad minim veniam, quis nostrud exerci tationull... Tags: Dataset, Ion Acceleration, ELI Beamlines. Action: launch VM.

Dashboard:

- New Messages 1:** Alice Fischer Analysis of experiment at ESRF. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat... GO TO MESSAGES
- Resources:**
 - CPU-hours used: 72 / 140 (72% used). REQUEST MORE
 - GPU-hours used: 15 / 20 (75% used). REQUEST MORE

Oblačno okolje – PaNOSC – Predogled portala

My Home / Time-resolv.. search jupyterlab Time-resolvent spectros... VM Laser-driven Ion Acceleration fro...

Time-resolvent spectroscopy - run 1-52

Description

RP4-SRS focuses on time-resolvent 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. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat.

Title	Time-resolvent spectroscopy - run 1-52
Publisher	ELI Beamlines, Institute of Physics of the Czech Academy of Sciences
Author	Dr. Mark Green
Contact Email	mark.green@eli-beams.eu
Public Access Level	Public
Citation	Mark Green; (2016), Time-resolvent spectroscopy - run 1-52, DOI:110.7283/T5930R7W
Dataset Identifier	https://doi.org/10.7283/T5930R7W
Category	Time-resolved spectroscopy
Tags	Dataset, X-ray Spectroscopy, Pulsed Radiolysis, ELI Beamlines

Dataset

Date Created	2019-03-15 21:58:32
Last Update	2019-05-02 11:23:15
Views	8
Downloads	1
Size	328 MB
Files	26

Analysis

Existing Environments

Scattering - RUN 5
Last Update: 2019-05-02 11:23:15
Basic jupyterlab [OPEN](#)

[ADD TO MULTI-DATASET ENVIRONMENT](#)

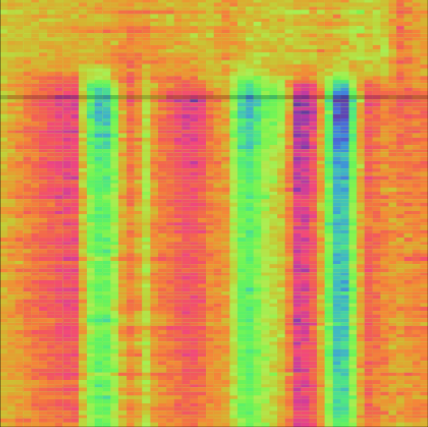
jupyterlab Environments

Basic 1 CPU 16 GB RAM CREATE	GPU Enabled 1 CPU 16 GB RAM GPU CREATE
Cluster 1 CPU 16 GB RAM Slurm Cluster CREATE	Custom Configure your own Jupyter environment SETUP

VM Remote Desktop Environments

Basic 1 CPU 16 GB RAM	GPU Enabled 1 CPU 16 GB RAM
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Preview Visualization

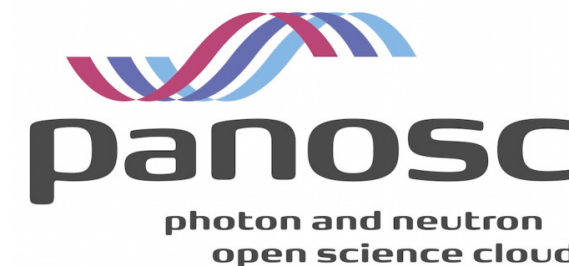


Pogled v prihodnost - Virtualni eksperimenti

- Implementacija **FAIR**
 - Findable: iskalnik po katalogih, metapodatkih in identifikatorju (DOI)
 - Accessible: kratko- in dolgoročna hramba
 - Interoperable: standardni formati podatkov (hdf, Nexus, openPMD) in metapodatkov (ontologija) za uporabo v različnih programih (APIs)
 - Reusable: dovolj metapodatkov za kasnejšo uporabo
- Strojno učenje in umetna inteligenca

PaNOSC

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