



Technical Talk - ELI

8th of October 2020



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.

Overview

- ELI and involved people
- The Portal Architecture test experience
- COVID and the impact on the team's roadmap



Facility

ELI (Extreme Light Infrastructure)

ELI Beamlines (CZ)

ELI ALPS (HU)

Beamlines in operation:

- Several beamlines are already operational
- We are still in the commissioning process (several beamlines will be operational in the near future)



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Team

Jakub Grosz (ELI Beamlines)

Software Developer – RP6 Theory and Simulation: VBL Team

Expertise in UI,UX, Web 3D and VR/AR technologies

Will contribute to WP4 Data Analysis Services, 0,5 FTE

Jiří Majer (ELI Beamlines)

Software Developer – RP6 Theory and Simulation: VBL Team

Expertise in frontend web technologies

Will contribute to WP4 Data Analysis Services, FTE

Mariana Kecová (ELI Beamlines)

Software Developer – RP6 Theory and Simulation: VBL Team

Expertise in scientific visualization and Web 3D technologies

Will contribute to WP4 Data Analysis Services, 0,25 FTE



Team

Teodor Ivanoaica (ELI-DC International Association AISBL)
Senior Coordinator for Scientific Computation and Data Management
Expertise in Storage and Computing, Distributed storage and Computing technologies
Will coordinate the integration of the computing tools with the Portal

Florian Gliksohn (ELI-DC International Association AISBL)
Deputy Director - Integrated Organisational Development
Will contribute to WP 1 Management



Team

Lajos Schrettner (ELI ALPS)

Software Engineering Group leader - Engineering Department
Expertise in software engineering methodologies, programming languages,
parallel and distributed computing technologies
Will contribute to WP3 Data Catalogue Services

Tamás Gaizer (ELI ALPS)

Software Architect
Expertise in database technologies
Will contribute to WP6 EOSC Integration

Róbert Rácz (ELI ALPS)

Software Engineer - Engineering Department
Expertise in database and web application technologies
Will contribute to WP3 Data Catalogue Services



The Portal Architecture test experience

- What went well?
 - Deployment on Kubernetes using Helm charts
 - Integration of frontend with related services
- What could go better?
 - More complete documentation including overall architecture of the portal and the search infrastructure
- What is the gap between what's in your facility and what the Portal needs?
 - Availability of infrastructure based on Search API
 - Finalizing deployment infrastructure (k8s, slurm + jupyter nb integration)



Portal prerequisites

- Name the features you would prioritize/what does the portal need in order to run in your facility?
 - Connecting local slurm manager w/ backend services
 - File catalogue creation / Data Management Systems / AAI integrations
 - Additional functionality for accessing other web services for users and facility staff: 3D experiment configurator, 3D interactive data visualization



Current technical challenges

- Bridge between DAQ and computing infrastructure
- Implementation of data catalogue
- Search API reflection - return its capabilities and available filters
- Integration of shared data portal and different computing infrastructures on the two ELI sites
- Portal work: scalable UI system, advanced search solution



Hiring

- WP3 + WP4: Software Engineer - DataOps (ELI BL)
- WP3: Data Engineer (ELI ALPS)
- WP6: Data Steward (ELI ALPS)



COVID-19 and the impact on your team

- Delayed work on computing infrastructure for remote data analysis
- Delayed hiring



Title

Techniques

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

Diffraction imaging

Search

Reset

Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas

Valentia / EU / Eschepov / EPS

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 ...

Petr Valentia, (2020), Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas, DOI:10.1142/90217751x19430103

Reflectometry

Type

Publication

Licence / Visibility

MIT / Public

Started on


03/10/2020

Ended on

03/10/2020

Released on

03/10/2020



Laser-Driven Proton Acceleration from Cryogenic Hydrogen Target

Bainbold / CERIC-ERIC / Austria / ESS

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 300 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 aft quantum plasma collector, DOI:10.9563/IF.2015.87.012

X-ray excited optical luminescence

Type

Proposal

Licence / Visibility

MIT / Public

Started on

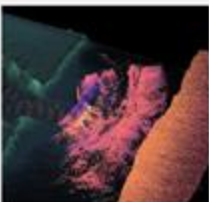
08/11/2017

Ended on

03/21/2019

Released on

01/01/2020



Laser Produced Gamma Rays Trajectories

Viktor / EL / Achakios / EU

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 totter in the complex electromagnetic fields in front of it....

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Diffraction imaging

Type

Proposal

Licence / Visibility

MIT / Public

Started on


08/11/2017

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03/21/2019

Released on

01/01/2020



Wake Wave Generation

Chaya / EU / HMR / CERIC-ERIC

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 conditi...

Dana Scully, (2020), Re-polarization of the aft quantum plasma collector, DOI:10.9563/IF.2015.87.012

Soft diffraction

Type

Proposal

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MIT / Public

Started on

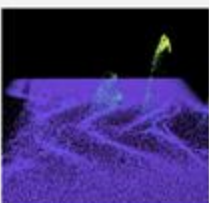
08/11/2017

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Time-resolvent spectroscopy - run 1-52

Bell / ESS / Sánchez / ESS

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....

Dana Scully, (2020), Re-polarization of the aft quantum plasma collector, DOI:10.9563/IF.2015.87.012

Spectroscopy

Type

Proposal

Licence / Visibility

MIT / Public

Started on

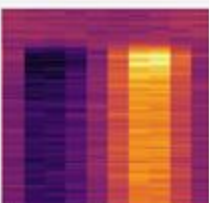
08/11/2017

Ended on

03/21/2019

Released on

01/01/2020



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

Chernyshev / ESRF / ESS


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

Type

Proposal

Licence / Visibility

MIT / Public



Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas

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 of the relativistic mirror as well as the factors of electric field amplification and frequency upshift of the electromagnetic wave are obtained.

Citation

Petr Valentia, (2020), Recoil Effects on Reflection from Relativistic Mirrors in Laser Plasmas, DOI:10.1142/90217751x19430103

Keywords

Reflectometry,

Type

Publication

Author

Petr Valentia

Other

Stuff

Datasets

PIC Simulation

Luk @ ESS

PIC Simulation - EPOCH

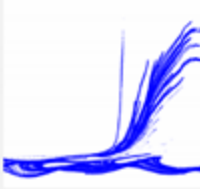
Luk @ ESS

PIC Simulation - SMILEY


ODIN @ ESS

Environments

Preview Visualization





DEMO



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