



PERLE@Orsay

**A novel facility for ERL development
 and applications in multi-turn configuration
 and high-power regime**

The development of ERLs has been recognized as one of the five main pillars of accelerators R&D in support of the European Strategy for Particle Physics (ESPP). The ERL Roadmap Panel recognized PERLE project as “a central part of the roadmap for the development of energy-recovery linacs”, with milestones to be achieved by the next ESPP in 2026.

PERLE at Orsay is a project aiming at the construction of a novel ERL machine for the development and application of the energy recovery technique in multi-turn configuration, large current and large energy regime. It will operate in a 3-turns mode, first at 250 MeV, then upgraded to 500 MeV with 20mA beam current. Such challenging parameters make PERLE a unique multi-turn ERL facility operating at an unexplored operational power regime (10MW), studying and validating a broad range of accelerator phenomena, paving the way for the future larger scale ERLs.

PERLE machine opens a new frontier for the physics of “the electromagnetic probe”. It will be the first ERL dedicated to Nuclear Physics for studying the eN interaction with radioactive nuclei. PERLE is also the necessary demonstrator for the future HEP machine (LHeC / FCC-eh) (same technological choices & beam parameters). PERLE could also host elastic ep scattering experiments and experiments on Nuclear Photonics using inverse Compton scattering gammas.

In this seminar we will present the PERLE project focusing on the challenges on accelerators physics and presenting the possible physics applications. We will also show the project structuration in an international collaboration and a timeline for the TDR phase and the following staged construction steps toward the PERLE machine at its nominal performances.

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