Contribution ID: **167** Type: **Invited talk**

Acceleration of polarized protons from laser-plasmas

Thursday, 21 September 2023 11:00 (30 minutes)

High-energy, spin-polarized particles are of great interest for a variety of applications like deep-inelastic scattering for the investigation of the proton nuclear structure or fusion, where the use of polarized reactants can increase the fusion cross-section. Acceleration of such particles via laser-plasma interaction can prove to be difficult, as the target needs to be pre-polarized. This rules out solid-state based mechanisms. Further, strong laser fields can induce the final beam's depolarization. Thus, novel acceleration schemes are required to ensure a significant degree of polarization.
In this talk, we will present an overview of the state-of-the-art for the acceleration of spin-polarized protons. Two acceleration mechanisms, Magnetic Vortex Acceleration and Collisionless Shock Acceleration, will by investigated by means of particle-in-cell simulations. The two schemes prove to be feasible options for producing highly polarized proton beams even for parameters of near-future laser facilities.

Primary authors: Dr REICHWEIN, Lars (Heinrich-Heine-Universität Düsseldorf); Prof. BÜSCHER, Markus (Forschungszentrum Jülich); Prof. PUKHOV, Alexander (Heinrich-Heine-Universität Düsseldorf)

Presenter: Dr REICHWEIN, Lars (Heinrich-Heine-Universität Düsseldorf)

Session Classification: Plenary session

Track Classification: Invited