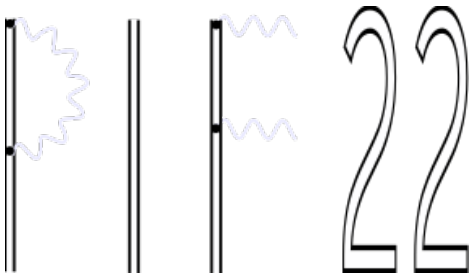

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Acceleration of spin-polarized proton beams from a dual-laser pulse scheme

Wednesday 31 August 2022 15:10 (20 minutes)

The acceleration of spin-polarized particle beams from laser-plasma interaction has gained a lot of interest in recent years due to the availability of high-intensity lasers and their applications for investigating strong-field phenomena. In particular, probing the nuclear structure of protons and neutrons requires polarized particle beams [1]. In this talk, we will present a setup consisting of two laser pulses with anti-parallel polarization propagating side-by-side through a near-critical density target [2]. In contrast to magnetic vortex acceleration, an additional proton filament in the space between the two pulses is formed and ejected at the end of the plasma target. Our particle-in-cell simulations show that the spatial separation of the two laser pulses leads to better spin polarization while still delivering good angular spread.

[1] M. Büscher et al., doi:10.1017/hpl.2020.35, High Power Laser Sci (2020)
[2] L. Reichwein et al., arXiv:2201.11534v2 (2022)

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