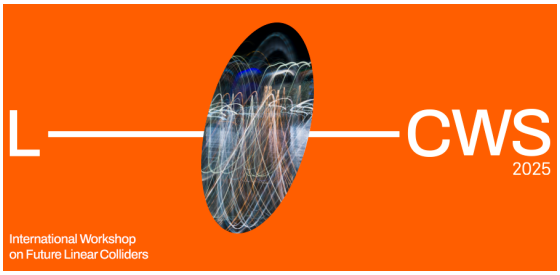

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ALiVE: Proton-driven plasma wakefield acceleration for collider applications

Thursday 23 October 2025 09:00 (20 minutes)

Current hadron accelerators can deliver energies far beyond those of lepton acceleration schemes, but this energy is divided among the partons. Plasma wakefield acceleration offers a method to transfer energy from a drive beam to a witness, allowing existing proton accelerators to be transformed into lepton machines. Relatively little civil engineering would be required due to the high gradients which plasma offers, and the re-use of existing infrastructure makes this scheme extremely attractive. The application of this concept to a Higgs factory driven by 400 GeV protons was recently proposed [Farmer, Caldwell and Pukhov, NJP (2024)]. In the present work, we discuss the ongoing efforts to address the challenges to realising such a scheme, including options for a suitable proton source, and possible upgrade paths for particle physics applications beyond a Higgs factory.

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