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# A laser-to-beam-driven plasma wakefield accelerator

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Plasma wakefield accelerators can be driven by either an intense laser pulse (LWFA) or a high-current particle beam (PWFA). A plasma accelerator combining both schemes consists of a LWFA providing an electron beam which subsequently drives a PWFA in the highly nonlinear regime. This scenario explicitly makes use of the advantages unique to each method, particularly exploiting the capabilities of PWFA schemes to provide energy-boosted high-brightness beams, while the LWFA stage inherently fulfils the demand for compact high-current electron bunches required as PWFA drivers. Effectively, the subsequent PWFA stage operates as a beam brightness and energy booster of the initial LWFA output, aiming to match the demanding beam quality requirements of accelerator based light sources. We present a design study based on theoretical considerations and full-detailed particle-in-cell simulations, aiming to address the feasibility and the capabilities of this promising strategy. Besides, we report on dedicated studies towards the implementation of a proof-of-principle experiment at the DRACO laser facility at Helmholtz-Zentrum Dresden-Rossendorf (HZDR).

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