

Staging in LWFA - challenges and prospects

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It is likely that the achievement of electron beam energies significantly above 10 GeV with plasma wakefield acceleration will require the successful coupling of multiple independent stages. To maintain a high average acceleration gradient over the full length of the accelerator it is critical that the space used to couple the driver into the plasma is kept as compact as possible, and in this respect, using a laser as a driver is advantageous. However, achieving this compact coupling while also minimising emittance growth and satisfying the tight spatiotemporal alignment requirements is difficult, and may require trade-offs. In this talk, the current state of laser-driven staging will be presented, and proposed solutions to the challenges faced by both multi-stage acceleration in general, and LWFA specifically, will be discussed.

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