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Transport line design for laser wakefield accelerators

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Laser WakeField Accelerators (LWFA) are a promising alternative for many industrial and medical applications. Despite significant progress, the use of LWFAs for real-world applications requires improvements in beam and transport quality. LWFAs beams differ from those studied in conventional accelerators. This calls for a dedicated study of transport lines for laser plasma acceleration. The aim is to control the quality of the beam in the line, despite the constraints imposed by the beam leaving the plasma of an LWFA (emittance, energy dispersion and divergence important for small sizes). Several configurations are therefore studied using TraceWin and optimization codes. As a result, scaling laws are obtained to impose limits on the characteristics of the beam produced by the plasma stage, depending on the targeted applications.

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