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Interstage optics design for a plasma wakefield linear collider

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Plasma wakefield acceleration offers acceleration gradients of several GeV/m as well as high power efficiency, ideal for a next-generation linear collider. The beam optics requirements between each plasma stage include injection and extraction of drive beams, controlling and matching the main beam beta functions to the plasma, cancelling dispersion as well as constraining bunch lengthening and chromaticity. To maintain a high effective acceleration gradient, this must be accomplished in the shortest distance possible. We present scaling laws for a working design, including a discussion of novel methods to address chromaticity correction.

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