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Self-matching in a quasilinear wakefield

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Particle acceleration in a quasilinear plasma wake provides access to high acceleration gradients while avoiding self-trapping of the background electrons. However, this regime is highly nonlinear, with the focussing field acting on an externally injected witness bunch strongly dependent on the plasma response to the witness itself. Here we discuss matching of the witness bunch to the plasma, and show how the unique physics of the quasilinear wake gives rise to broad tolerances for the witness bunch radius at the injection point.

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