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Optimization Studies of a Multi-GeV Single Stage Laser-Plasma Accelerator[1] G.M. TARKENTON, Institute for Advanced Physics, B.A. SHADWICK, Department of Physics and Astronomy, University of Nebraska Lincoln and Institute for Advanced Physics, C.B. SCHROEDER, E. ESAREY, LOASIS Program, LBNL — Using a self-consistent Hamiltonian model of beam transport in a background plasma[2], we consider the design of a single stage, multi-GeV plasma accelerator. In this model the beam is described by phase-space moments and the bulk plasma is taken to be a cold fluid. We present a detailed study of beam propagation in a resonant laser-wakefield accelerator with final energy gain between 5 and 10 GeV. We discuss optimization of the system with regard to energy gain and beam quality.

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[2]B. A. Shadwick, G. M. Tarkenton and C. B. Schroeder, Bull. Am. Phys. Soc., **50**, 283 (2005).

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