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Shock injection producing narrow energy spread, GeV electron beams from a laser wakefield accelerator[1] J.A. CARDARELLI, University of Michigan, M.J.V. STREETER, C. COLGAN, Imperial College London, D. HOLLATZ, Helmholtz Institute Jena, A. ALEJO, Oxford University, C. ARRAN, C.D. BAIRD, University of York, M.D. BALCAZAR, University of Michigan, E. GERSTMAYR, Imperial College London, HARSH HARSH, Helmholtz Institute Jena, B. KETTLE, E. LOS, Imperial College London, C. ROEDEL, F. SALGODO, Helmholtz Institute Jena, G.M. SAMARIN, G. SARRI, The Queens University of Belfast, A.G.R. THOMAS, University of Michigan, C.I.D. UNDERWOOD, University of York, M. ZEPF, Helmholtz Institute Jena, S.P.D. MANGLES, Imperial College London — The parameters of electron beams produced by a laser wakefield accelerator are in large part determined by the dominant injection mechanism. In shock injection the driving laser pulse crosses abruptly from a region of high plasma density to one of lower density. The sudden change in the plasma wavelength leads to injection of electrons. Shock injection has been successfully employed on lower power (< 100 TW) systems where it produces tunable narrow energy spread electron beams (Buck et al PRL 2013). Here we present an investigation of shock injection on the higher power Gemini laser system (> 200 TW). In this case shock injection can produce high energy (> 1 GeV), narrow energy spread ($< 5\%$) electron beams. The injection here is found to be sensitive to the position of shock front within the accelerator, in contrast to previous results at lower power.

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Jason Cardarelli
University of Michigan

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