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Laser wakefield-accelerated multi-GeV electrons using the Texas Petawatt Laser NEIL FAZEL, RAFAL ZGADZAJ, XIAOMING WANG, Institute for Fusion Studies, University of Texas at Austin, WATSON HENDERSON, PENG DONG, University of Texas at Austin, RICHARD KORZEKWA, YEN-YU CHANG, HAI-EN TSAI, AUSTIN YI, VLADIMIR KHUDIK, Institute for Fusion Studies, University of Texas at Austin, SERGUEI KALMYKOV, University of Texas at Austin, GILLIS DYER, ERHARD GAUL, AARON BERNSTEIN, MIKAEL MARTINEZ, TED BORGER, FRANKI AYMOND, DOUG HAMMOND, Center for High Energy Density Science, University of Texas at Austin, R. ESCAMILLA, University of Texas at Austin, SRDJAN MARIJANOVIC, Center for High Energy Density Science, University of Texas at Austin, GENNADY SHVETS, TODD DITMIRE, MICHAEL DOWNER, University of Texas at Austin, LFWA TEAM —
Interaction of intense laser pulse and underdense plasma is a promising source for generating multi-GeV electrons beams within the compact confines of the lab. The quality of the electron beam, stability of the electron generation, and scalability to higher energies, are some of the challenges that are being met. We report on a laser wakefield acceleration experiment taking advantage of the powerful Texas Petawatt laser, and using relatively low plasma density together with ionization induced injection, to accelerate electrons. Self-focusing and self-guiding of the laser beam, self-injection and trapping of electrons, and some approaches to diagnostics of accelerated electrons are discussed.

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