Abstract Submitted
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Contrast and Intensity upgrades to the Texas Petawatt laser for hadron generation and non-linear QED experiments[1] BJORN M. HEGELICH, ALEXEY AREFIEV, TODD DITMIRE, MICHAEL E. DONOVAN, GILLIS DYER, ERHARD GAUL, LANCE LABUN, SCOTT LUEDTKE, MIKAEL MARTINEZ, EDWARD MCCARRY, DAVID STARK, ISHAY POMERANTZ, GANESH TIWARI, TOMA TONCIAN, University of Texas at Austin — Advances in laser-based hadron generation, especially with respect to particle energy, as well as reaching the new regime of radiation dominated plasmas and non-linear QED, require laser fields of Petavolts per meter that preferably interact with very high density, overcritical plasmas. To achieve these conditions we are upgrading the Texas Petawatt Laser both respect to on-target laser intensity and laser-contrast, aiming to reach intensities of $\sim$ 5x10^{22} W/cm^2 and pulse contrast parameters allowing the interaction with overcritical, yet ultrathin, sub-micron targets. We will report on the planned experiments aimed at ion acceleration, neutron generation and the first experimental measurement of radiation reactions to motivate the chosen upgrade parameters. We will further report on the technical changes to the laser and present first measurements of the achieved intensity and contrast parameters.

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