

Abstract Submitted
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Pulse Front Tilt and Laser Plasma Acceleration¹ DANIEL MITTELBERGER, University of California-Berkeley and Lawrence Berkeley National Laboratory, MAXENCE THÉVENET, KEI NAKAMURA, REMI LEHE, ANTHONY GONSALVES, CARLO BENEDETTI, WIM LEEMANS, Lawrence Berkeley National Laboratory — Pulse front tilt (PFT) is potentially present in any CPA laser system, but its effects may be overlooked because spatiotemporal pulse characterization is considerably more involved than measuring only spatial or temporal profile [1]. PFT is particularly important for laser plasma accelerators (LPA) because it influences electron beam injection [2] and steering [3]. In this work, experimental results from the BELLA Center will be presented that demonstrate the effect of optical grating misalignment and optical compression, resulting in PFT [4], on accelerator performance. Theoretical models of laser and electron beam steering will be introduced based on particle-in-cell simulations showing distortion of the plasma wake. Theoretical predictions will be compared with experiments and complementary simulations, and tolerances on PFT and optical compressor alignment will be developed as a function of LPA performance requirements. [1] G. Pretzler, A. Kasper, and K.J. Witte, *Appl Phys B* 70 (2000), 1–9 [2] M. Schnell et al., *Nature Comm* 4 (2013), 2421 [3] A. Popp et al., *Phys Rev Lett* 105 (2010), 215001 [4] K. Nakamura et al., *IEEE J Quant Electron* 53 (2017) 1-21

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