

Abstract Submitted  
for the DPP17 Meeting of  
The American Physical Society

**Measured emittance dependence on injection method in laser plasma accelerators**<sup>1</sup> SAMUEL BARBER, JEROEN VAN TILBORG, CARL SCHROEDER, REMI LEHE, HAI-EN TSAI, KELLY SWANSON, SVEN STEINKE, KEI NAKAMURA, CAMERON GEDDES, CARLO BENEDETTI, ERIC ESAREY, WIM LEEMANS, Lawrence Berkeley National Lab — The success of many laser plasma accelerator (LPA) based applications relies on the ability to produce electron beams with excellent 6D brightness, where brightness is defined as the ratio of charge to the product of the three normalized emittances. As such, parametric studies of the emittance of LPA generated electron beams are essential. Profiting from a stable and tunable LPA setup, combined with a carefully designed single-shot transverse emittance diagnostic, we present a direct comparison of charge dependent emittance measurements of electron beams generated by two different injection mechanisms: ionization injection and shock induced density down-ramp injection. Notably, the measurements reveal that ionization injection results in significantly higher emittance. With the down-ramp injection configuration, emittances less than 1 micron at spectral charge densities up to  $\sim 2$  pC/MeV were measured.

<sup>1</sup>This work was supported by the U.S. DOE under Contract No. DE-AC02-05CH11231, by the NSF under Grant No. PHY-1415596, by the U.S. DOE NNSA, DNN RD (NA22), and by the Gordon and Betty Moore Foundation under Grant ID GBMF4898

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Date submitted: 14 Jul 2017

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