

Abstract Submitted
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Multi-bunch Plasma Wakefield Accelerator Experiments at the BNL ATF¹ PATRIC MUGGLI, THEMOS KALLOS, TOM KATSOULEAS, USC, VITALY YAKIMENKO, MARCUS BABZIEN, KARL KUSCHE, IGOR POGORELSKY, BNL, WAYNE KIMURA, STI Optronics — We present initial results obtained with a plasma wakefield accelerator driven by a train of microbunches. The microbunch train is produced with a masking technique [P. Muggli et al., this conference]. The plasma is produced in a cm-long gas-filled capillary discharge. The plasma density is measured using Stark broadening of the hydrogen H-alpha line. It is adjusted such that the plasma wavelength is equal to the microbunches spacing. In this case the train resonantly drives the wake, and the accelerating field behind the train with a variable number of microbunches is maximized. The energy loss of each microbunch increases with the microbunch number and depends on the charge in each microbunch. The accelerating wake field is sampled by a witness bunch following the drive train. This multi-bunch method could be used to multiply the energy of a future linear particle collider with a high efficiency. The experimental set-up, as well as detailed experimental results will be presented.

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