

Abstract Submitted  
for the DPP07 Meeting of  
The American Physical Society

**A high gradient plasma wakefield accelerator using two subpicosecond electron bunches** EFTHYMIOS KALLOS, PATRIC MUGGLI, TOM KATSOULEAS, USC, KARL KUSCHE, IGOR PAVLISHIN, IGOR POGORELSKY, DANIIL STOLYAROV, VITALY YAKIMENKO, BNL, WAYNE KIMURA, STI Optronics, Inc — A high gradient plasma wakefield accelerator was tested at the Accelerator Test Facility of Brookhaven National Lab. Two  $\sim 100$ fs electron bunches with total charge of 0.5nC separated by  $\sim 500$ fs were fed into a 6mm long high density ( $1e14/cc$  to  $1e17/cc$ ) plasma generated by an ablative capillary discharge. The drive bunch created a  $\sim 300$ MV/m wakefield that was sampled by the short witness bunch. The relative position of the witness bunch with respect to the drive bunch wakefield could be adjusted by varying the plasma density, thus allowing controllable energy loss or energy gain with small energy spread. The experimentally observed energy shifts are in good agreement with 2D model predictions.

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Date submitted: 18 Jul 2007

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