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## Electron probing of laser wakefield at the Accelerator Test Facility

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Laser wakefield accelerators (LWFAs) have been experimentally shown to produce sustained gradients of tens of GeV/m over tens of centimeters. While the strength of these fields has been demonstrated, a direct measurement of the field configurations inside an LWFA represents an emerging research topic. Here, we report on the results of transverse probing of the fields inside an LWFA at densities of  $1e+15$  —  $1e+17$   $1/cm^3$ , corresponding to plasma wavelengths in the range of several hundred microns. The LWFA is driven by BNL Accelerator Test Facility's unique long-wave-infrared CO<sub>2</sub> laser (9.2  $\mu$ m) pulse, which currently generates 2 ps long pulses at 2-3 TW. The linac-produced electron beam has an energy of 50-60 MeV and about a 200 fs long bunch length. A YAG:Ce scintillator placed on a translation stage records the electron beam density profile at distances of up to 10 cm from the plasma. Particle-In-Cell Simulations using OSIRIS are used to corroborate the results of the experiment.

### Footnotes

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**Primary author:** GAIKWAD, Apurva (Stony Brook University)

**Co-authors:** POGORELSKY, Igor (Brookhaven National Laboratory); PETRUSHINA, Irina (State University of New York at Stony Brook); KUSCHE, Karl (Brookhaven National Laboratory); MILLER, Kyle (University of California, Los Angeles); BABZIEN, Marcus (Brookhaven National Laboratory); PALMER, Mark (Brookhaven National Laboratory); DOWNER, Michael (The University of Texas at Austin); FEDURIN, Mikhail (Brookhaven National Laboratory); POLYANSKIY, Mikhail (Brookhaven National Laboratory); VAFAEI-NAJAFABADI, Navid (Stony Brook University); ZGADZAJ, Rafal (The University of Texas at Austin); KUPFER, Rotem (Brookhaven National Laboratory)

National Laboratory); LITVINENKO, Vladimir (Stony Brook University); LI, William (Brookhaven National Laboratory)

**Presenter:** GAIKWAD, Apurva (Stony Brook University)

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