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A Compact High Brightness Electron Source

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Short wavelength acceleration techniques, e.g. in the THz range, promise high field gradients but suffer from severe phase slippage at non-relativistic particle energies due to the small normalized vector potential that can be realized with these techniques. By combining a compact, amplifier driven S-Band rf gun with an adiabatically tapered dielectric-lined waveguide THz accelerator promising high brightness beam parameters have been found in simulations. We present prototype results of the compact rf gun and discuss the transverse and longitudinal beam dynamics in the subsequent adiabatically tapered acceleration section in terms of the normalized vector potential.

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