# Demonstration of a compact narrow-bandwidth THz source

RadiaBeam Technologies has developed and demonstrated a compact source of narrow bandwidth free space THz radiation beams. A thermionic injector generates electron beam, which is compressed in an alpha magnet and propagated through a few cm-long radiator. A prototype system was commissioned at Argonne National Laboratory, and demonstrated a strong signal (> 100 kW peak power), at 500 μm wavelength, in ~ 5% bandwidth.

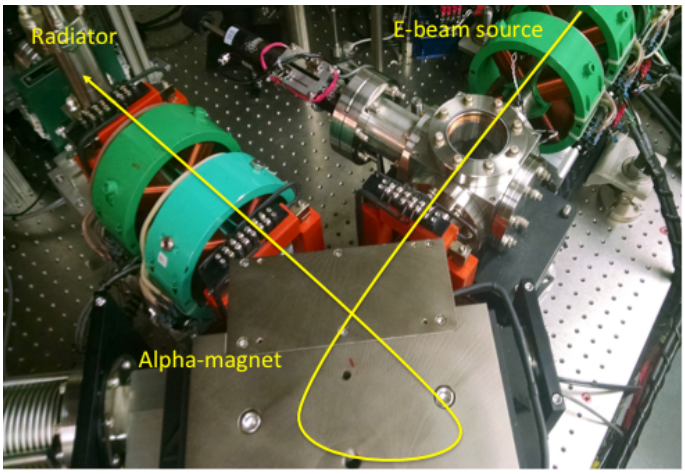


**Fig. 1: Schematics of the prototype THz source, a few MeV electron beam from a thermionic injector, is compressed in a 270° alpha-magnet and propagated to the corrugated pipe radiator.**

Such compact stand-alone source of tunable THz radiation, with high peak and average power, can significantly enhance practical viability of THz spectroscopy, imaging, and pump-probe diagnostics, in science and industry, including applications in chemistry, medicine, material science, drug discovery, security, and nanoengineering.

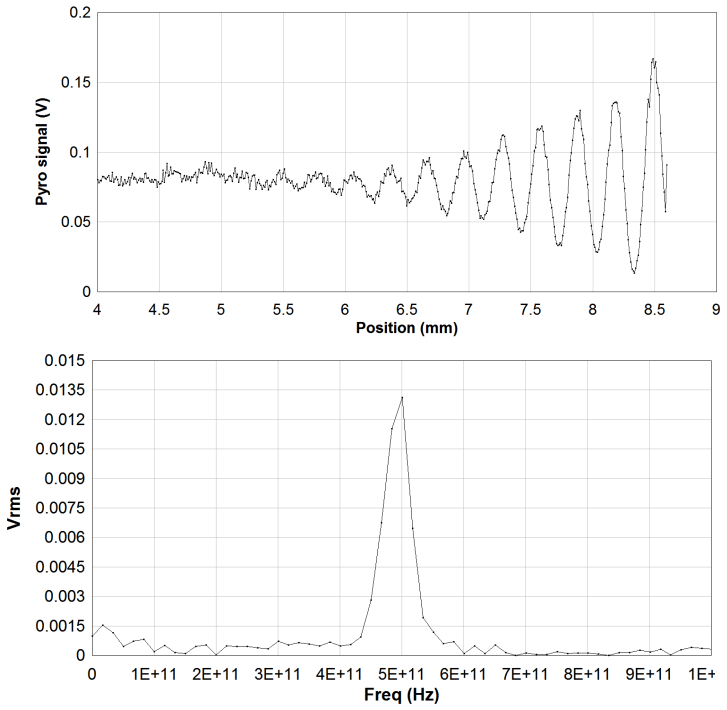


**Fig. 2: An autocorrelation trace (top) and a corresponding spectrum (bottom) of the THz signal.**

The entire prototype system fits on a single optical table, and the field deployable system can be reduced much further in size. The commercial version of the system will be offered to customers in 2015, starting at $600 K. The system will be sold as a stand-alone THz source, and include multiple options, such as THz diagnostics suite and software. Synchronized X-ray and optical laser add-on modules are also available.

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