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High Power Terahertz Conductive Antenna with Chaotic Electrodes[1] CHRISTOPHER KIM, BENJAMIN GRABER, DONG HO WU, Naval Research Laboratory — Time domain terahertz spectroscopy (TDTS) is now widely adopted and being used for various purposes, including chemical and material analysis as well as detection of hazardous materials in the laboratories. While there are several different methods available to generate a wideband terahertz pulse for the TDTS, currently a terahertz photoconductive antenna may be the most popular one, as it can produce a wideband terahertz pulse very efficiently. However our experimental investigation indicates that the conventional photoconductive antenna with a pair of parallel electrodes can produce a terahertz pulse at most about 100 micro-Watts. When attempted to produce a higher power terahertz pulse the antenna may experience irrevocable failure. In order to overcome this problem we recently redesigned the photoconductive antenna and implemented electrodes that lead to a chaotic trajectories of charged particles. With the new electrodes we have demonstrated a high power (>2 mW) coherent terahertz beam, and we found that the lifetime of the antenna is also substantially longer than that of the conventional antenna. In this talk I will present our experimental results and disclose some of our new antenna designs.

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