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Individual Single-Walled Carbon Nanotube Device Fabrication for Terahertz Detection[1] CHRIS MCKITTERICK, Physics Department, Yale University, JOEL CHUDOW, DANIEL SANTAVICCA, LUIGI FRUNZIO, Applied Physics Department, Yale University, DANIEL PROBER, Physics and Applied Physics Departments, Yale University, PHILIP KIM, Physics and Applied Physics Departments, Columbia University — We describe the fabrication process for the development of antenna-coupled single-walled carbon nanotube (CNT) terahertz (THz) detectors. This requires the development of a lithographically-defined gate electrode, as the device is fabricated on a THz-transparent insulating silicon substrate. Antenna development is geared towards accessing the largest possible bandwidth to facilitate the study of standing wave resonances in the CNT. These standing wave resonances are expected from the one-dimensional Tomonaga-Luttinger Liquid theory, which predicts collective charge oscillations, known as plasmons, which travel faster than the Fermi velocity. Using a Fourier transform interferometer, we excite the antenna-coupled CNT with a broadband blackbody source and probe the THz impedance of the CNT through Joule heating.

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