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Cooling Electron Plasmas by Cyclotron-Cavity Resonance ALEX POVILUS, MARCELO BAQUERO-RUIZ, STEVE CHAPMAN, JOEL FAJANS, University of California, Berkeley — A robust technique for cooling trapped non-neutral plasmas is to allow leptons to thermalize to the temperature of the experimental environment through cyclotron emission. Storing these plasmas in a high-Q cavity can enhance or inhibit this cooling mechanism dependent on the cyclotron frequency, the electromagnetic mode structure in the cavity, and the profile of the trapped plasma. Also, thermalization rates may be limited as temperatures in the system approach the energy spacing between Landau levels- the quantum mechanical levels of transverse particle motion in the system. This is a regime possible in a cryogenic environment with high magnetic fields, such as typically used in Penning-Malmberg traps. Here, we report on the progress of the cold electron research experiment at UC Berkeley designed to measure these effects.

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