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**Controlling the Electron Energy Distribution Function Using an Anode**[1] SCOTT D. BAALRUD, University of Iowa, EDWARD V. BARNAT, MATHEW M. HOPKINS, Sandia National Laboratory — Positively biased electrodes inserted into plasmas influence the electron energy distribution function (EEDF) by providing a sink for low energy electrons that would otherwise be trapped by ion sheaths at the chamber walls. We develop a model for the EEDF in a hot filament generated discharge in the presence of positively biased electrodes of various surface areas, and compare the model results with experimental Langmuir probe measurements and particle-in-cell simulations. In the absence of an anode, the EEDF is characterized by a cool trapped population at energies below the sheath energy, and a comparatively warm tail population associated with the filament primaries. Anodes that are small enough to collect a negligible fraction of the electrons exiting the plasma have little affect on the EEDF, but as the anode area approaches $\sqrt{m_e/m_i}A_w$, where $A_w$ is the chamber wall area, the anode collects most of the electrons leaving the plasma. This drastically reduces the density of the otherwise trapped population, causing an effective heating of the electrons and a corresponding density decrease. A global model is developed based on the EEDF model and current balance, which shows the interconnected nature of the electron temperature, density and the plasma potential.

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