

Abstract Submitted  
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**Multiple electron distributions in multidipolar plasma devices**  
SCOTT ROBERTSON, SCOTT KNAPPMILLER, University of Colorado — Hot filament discharge devices with multidipolar surface magnetic fields have densities and temperatures higher than in these devices without multidipolar fields. We compare Langmuir probe data from a device operated with and without surface multidipolar fields. The data show that for both configurations the electrons with energy below about 10 eV consist of two populations: the bulk plasma electrons electrostatically confined by the plasma potential and the secondary electrons from the wall. For the device with the multidipolar fields, the secondary electrons from the walls are increased in density by about two orders of magnitude, indicating that these electrons are mirror confined by the multidipolar fields. This mirror confinement is aided by the electrostatic potential drop in the sheath at the wall. A relatively simple mathematical model for energy balance shows that the heating by the secondaries accounts for the increased temperature of the bulk plasma electrons.

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