

Abstract Submitted
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Total Non-Ambipolar RF Electron Source – Better than a Hollow Cathode¹ NOAH HERSHKOWITZ, BEN LONGMIER, SCOTT BAALRUD, Engineering Physics Department, University of Wisconsin-Madison — A Radio Frequency (RF) plasma based electron source has been developed based on results of our electron sheath studies in weakly collisional DC plasmas. In total non-ambipolar flow, all of the electrons leaving the plasma are lost through an electron sheath at the aperture. This occurs if the ratio of the ion loss area to the extraction aperture area is approximately equal to the square root of the ratio of the ion mass to the electron mass, and the ion sheath potential drop at the chamber walls is much larger than T_e/e . Gridless extraction of electrons is achieved by using an axial expanding magnetic field of (maximum value of 100 Gauss) that makes it possible to achieve a uniform plasma potential across the exit aperture. An electron current of 15 A was achieved with 15 sccm Ar and 1200 W.

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