

Abstract Submitted
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Xenon operation of the Non-ambipolar Electron Source¹ NOAH HERSHKOWITZ, BEN LONGMIER, Engineering Physics Department, University of Wisconsin-Madison — The Non-ambipolar Electron Source (NES) is an RF plasma-based electron source that does not rely on electron emission at a cathode. All of the random electron flux in NES is extracted through an electron sheath resulting in total non-ambipolar flow when the ratio of the ion loss area to the electron loss 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 . Operation with Xe has increased the output current (from previous results with Ar at 15 A) to 30 A when using 2.2 sccm Xe, and 1.2 kW RF power at 13.56 MHz and increased the gas utilization, the ratio of extracted electron current to neutral supply current, to 180. Operation with a graphite ion collector/Faraday shield has significantly reduced sputtering. NES could replace hollow cathode electron sources in a wide variety of applications. The physics behind the improved Xe operation compared to Ar is described.

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