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**Experimental Assessment of Plasma Transport in a 16-cm Multicusp Device** AIMEE HUBBLE, JOHN FOSTER, University of Michigan — The physics of plasma transport from the bulk plasma through the magnetic cusp to the anode remains poorly understood. A proper accounting of plasma losses to the anode is critical to accurate modeling of multicusp device performance. In this work, plasma transport in a 16-cm multicusp discharge chamber was studied. Each ring was covered with an electrically isolated electrode, which enables the direct measurement of current to each individual ring as well as the discharge chamber wall. A translatable Langmuir probe was used to obtain maps of spatially resolved plasma parameters in bulk plasma region. These maps of spatially resolved plasma density, electron temperature, and plasma potential were compared to current collection at the cusps as well as the magnetic circuit and device performance. Ring electrode measurements coupled with spatially resolved plasma parameter measurements throughout the discharge chamber allow for an assessment of plasma losses to each ring in terms of an "effective loss area" which, multiplied by electron current density incident on the bulk/cusp boundary, gives the correct collected current to each ring. A relationship between effective loss area and the physical loss area was determined that can be applied to a 0-D particle and energy balance model.

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