

Abstract Submitted  
for the DPP19 Meeting of  
The American Physical Society

**Patch Potential Induced Particle Loss in an Antimatter Penning-Malmberg Trap**<sup>1</sup> ANDREW CHRISTENSEN, JOEL FAJANS, JONATHAN WURTELE, University of California, Berkeley, ALPHA COLLABORATION — Even clean, gold plated, grounded metal surfaces inevitably generate anomalous electric fields. These fields are due to “patch potentials,” thought to be grain boundaries and charged oxide layers on the metal surfaces. These fields break the cylindrical symmetry of a Penning-Malmberg trap, and are investigated as the possible cause of observed anomalous antiproton escape, particularly in shallow traps with few antiprotons. An in-situ technique was developed for measuring the magnitude of these electric fields which involves using the patch potentials to move electron plasmas off-axis, and observing their subsequent orbit. We find fields on the order of tens of millivolts/cm. We present evidence that ultraviolet lasers used to probe the properties of antihydrogen atoms may strengthen these asymmetric fields.

<sup>1</sup>This work was supported by NSF and DOE OFES.

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Date submitted: 03 Jul 2019

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