

The Low Energy Neutral Imager (LENI) G. Clark¹, J. H. Westlake¹, D. G. Mitchell¹, E. Hoffer¹, and P. C. Brandt¹, ¹Johns Hopkins University Applied Physics Laboratory (george.clark@jhuapl.edu)

Introduction: To achieve breakthroughs in the areas of heliospheric and magnetospheric energetic neutral atom (ENA) imaging a new class of instruments is required. We present a high angular resolution ENA imager concept aimed at the suprathermal plasma populations with energies between 0.5 and 20 keV. This instrument is intended for understanding the spatial and temporal structure of the heliospheric boundary recently revealed by Interstellar Boundary Explorer (IBEX) instrumentation and the Cassini Ion and Neutral Camera (INCA). The instrument is also well suited to characterize magnetospheric ENA emissions from low-altitude ENA emissions produced by precipitation of magnetospheric ions into the terrestrial upper atmosphere, or from the magnetosheath where solar wind protons are neutralized by charge exchange, or from the ring-current region. We present a new technique utilizing ultra-thin carbon foils, 2D collimation, and a novel electron optical design to produce high-angular resolution ($\leq 2^\circ$) and high-sensitivity ($\geq 10^{-3}$ cm² sr/pixel) ENA imaging in the 0.5-20 keV energy range [1].

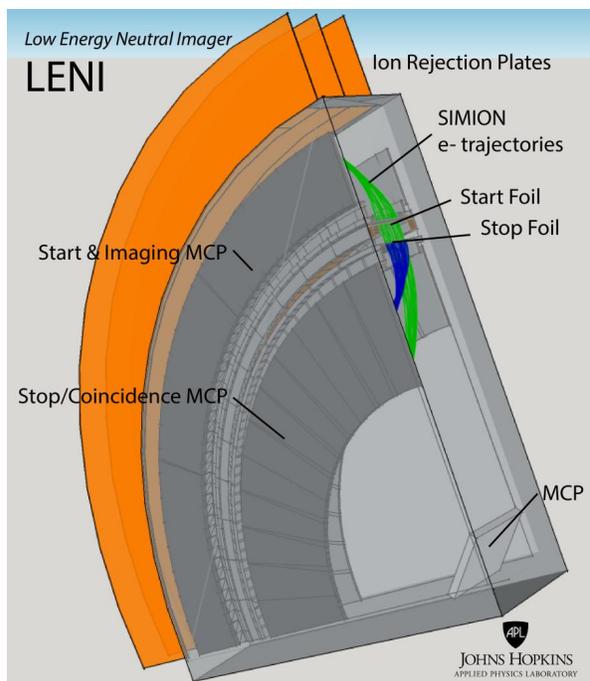


Figure 1: Conceptual drawing of LENI.

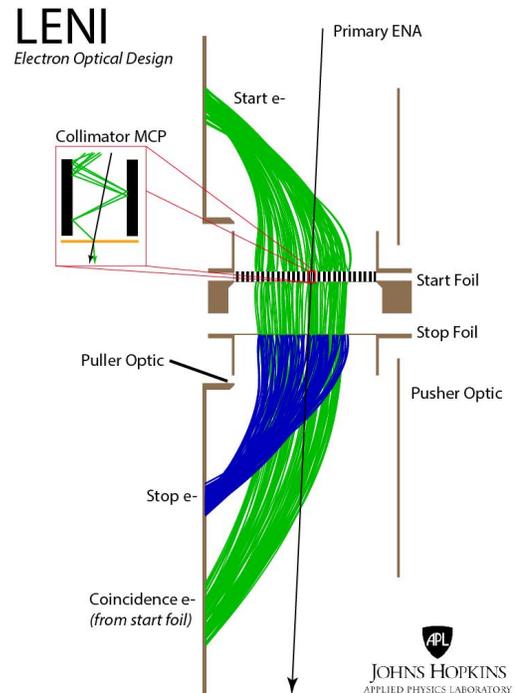


Figure 2: Schematic illustrating the electro-optics design using a particle simulation software package (SIMION).

References:

- [1] Westlake, J. H., D. G. Mitchell, P. C. Brandt, B. G. Andrews, and G. Clark (2016), The Low Energy Neutral Imager (LENI), *J. Geophys. Res. Space Physics*, 121, doi:[10.1002/2016JA022547](https://doi.org/10.1002/2016JA022547).