Thanks.

Abstract Submitted
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Electron holes observed in the Moon Plasma Wake[1] I H HUTCHINSON, MIT, D MALASPINA, University of Colorado, C ZHOU, MIT — Electrostatic instabilities are predicted in the magnetized wake of plasma flowing past a non-magnetic absorbing object such as a probe or the moon. Analysis of the data from the Artemis satellites, now orbiting the moon at distances ten moon radii and less, shows very clear evidence of fast-moving isolated solitary potential structures causing bipolar electric field excursions as they pass the satellite's probes. These structures have all the hallmarks of electron holes: BGK solitons typically a few Debye-lengths in size, self-sustaining by a deficit of phase-space density on trapped orbits. Electron holes are now observed to be widespread in space plasmas. They have been observed in PIC simulations of the moon wake to be the non-linear consequence of the predicted electron instabilities. Simulations document hole prevalence, speed, length, and depth; and theory can explain many of these features from kinetic analysis. The solar wind wake is certainly the cause of the overwhelming majority of the holes observed by Artemis, because we observe almost all holes to be in or very near to the wake. We compare theory and simulation of the hole generation, lifetime, and transport mechanisms with observations.

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