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Probes, Moons, and Kinetic Plasma Wakes[1] I H HUTCHINSON, MIT, D MALASPINA, University of Colorado, C ZHOU, MIT — Nonmagnetic objects as varied as probes in tokamaks or moons in space give rise to flowing plasma wakes in which strong distortions of the ion and electron velocity distributions cause electrostatic instabilities. Non-linear phenomena such as electron holes are then produced. Historic probe theory largely ignores the resulting unstable character of the wake, but since we can now simulate computationally the non-linear wake phenomena, a timely challenge is to reassess the influence of these instabilities both on probe measurements and on the wakes themselves. Because the electron instability wavelengths are very short (typically a few Debye-lengths), controlled laboratory experiments face serious challenges in diagnosing them. That is one reason why they have long been neglected as an influence in probe interpretation. Space-craft plasma observations, by contrast, easily obtain sub-Debye-length resolution, but have difficulty with larger-scale reconstruction of the plasma spatial variation. In addition to surveying our developing understanding of wakes in magnetized plasmas, ongoing analysis of Artemis data concerning electron holes observed in the solar-wind lunar wake will be featured.

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Ian Hutchinson
MIT

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