

Plasma Physics Seminar

UCLA College | Physical Sciences
Physics & Astronomy

Physics & Astronomy Building Room 3-326 (Astro Reading Room)
Thursday February 12th at 10:00 AM

The complicated lives of Electron Holes in collisionless space plasmas

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Electron holes are nonlinear electrostatic solitary potential peaks sustained by a deficit of collisionless trapped electrons; these Debye-scale structures are widely observed in space plasmas by satellites with fast-sampling field measurements. After a summary of how they are formed, examples of recent observations and theory will be given, such as their concentration in the solar wind wake of the Moon, and their allowed speed relative to the ions. Their extent transverse to the magnetic field is usually greater than their parallel length, but they are often unstable to kinks with finite transverse wavelength. Rigorous theory, developed over the past few years, will be outlined of the stability of initially one-dimensional electron holes. It answers theoretically key questions such as the conditions for their persistence, how long they last, and how deep and wide they can be: which are beginning to be probed by multi-satellite observations.

Host: Derek Schaeffer

