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## **Kinetic Simulations of the Rayleigh-Taylor Instability in Space Plasmas**

*Thursday 29 January 2026 16:00 (15 minutes)*

Equatorial Plasma Bubbles (EPBs) are large-scale depletions of ionospheric plasma density that disrupt radio wave propagation and satellite-based communication systems. They are commonly understood to arise from the nonlinear development of the Rayleigh–Taylor instability (RTI) in the equatorial ionospheric F-region under weakly collisional conditions. While their formation is typically modeled using fluid approaches, the ionosphere operates in regimes where kinetic effects may influence equilibrium. In this work, we intend to investigate the RTI using kinetic Particle-In-Cell (PIC) simulations performed with the OSIRIS framework. Preliminary results focus on the equilibrium properties of a system without effective acceleration, addressing whether a fluid equilibrium also constitutes a kinetic equilibrium, and assessing the role of magnetization in stabilizing the plasma.

### **Field of Research/Work**

Plasma and Solar Physics, Accelerators and Beams

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