

Johns Hopkins University

**Center for Environmental
& Applied Fluid Mechanics**

3:00 PM, Friday, January 30, 2026

Gilman Hall 50

Zoom: <https://wse.zoom.us/j/93762992307>

[Link for Spring 2026 recordings](#)



Dr. Sasha Ukhorskiy

Solar and Space Physics Group

Johns Hopkins University Applied Physics Laboratory

“Unveiling the Mysteries of Multiscale Magnetotail Dynamics with the CINEMA Constellation”

Abstract: Planetary magnetospheres are among the most dynamic and complex systems studied in heliophysics. Driven by their stellar environment and internal sources (e.g., planetary rotation or moons), these vast reservoirs of magnetic energy exhibit a range of dynamical states. Energy circulation (convection) through the system can be steady or explosive, triggering fast plasma flows, global current systems, and spectacular auroral displays. Understanding the response of magnetospheres to their stellar environment is essential for understanding the nature of our home in space, a key heliophysics goal. In Earth’s solar wind–driven magnetosphere, the magnetotail is a key region through which energy is circulated. How the magnetotail maintains steady convection, and when and how it decides to explosively release stored energy, are major unsolved mysteries of space physics. A significant challenge is the intrinsically multiscale nature of magnetotail convection, which is difficult to capture with the sparse measurements available so far. The CINEMA (Cross-Scale INvestigation of Earth’s Magnetotail and Aurora) SMEX Mission will provide a new cross-scale view of the magnetotail, revealing its large-scale configuration and its influence on dynamics at smaller scales. With a constellation of 9 spacecraft in low-earth orbit all equipped with a full complement of high-resolution energetic particle sensor, auroral imagers, and magnetometers, CINEMA will capture the plasmashet structure and evolution key for unveiling the mysteries of multiscale magnetospheric convection.

For more details, visit: <https://www.jhuapl.edu/about/people/sasha-ukhorskiy>

Hosted by: Prof. Charles Meneveau (MechE)