Pozvánka na seminár Ústavu experimentálnej fyziky SAV, v. v. i.

streda, 7. január 2026 o 11:00

Budova PROMATECH m. č. 108, Watsonova 47A, Košice

„Kinetic micro-turbulence and anomalous ion heating in magnetized plasmas with sheared flows“

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Anotácia:
Classical descriptions of ionospheric turbulence often neglected the role of shear flows and their effect on ion energization. Recent developments have shown that kinetic shear-driven instabilities play a decisive role in both anomalous ion heating and the formation of micro-turbulent structures in ionospheric plasmas.
In the first part of the seminar, I will focus on drift-type ion-temperature-gradient (ITG) electrostatic instabilities in the lower F-region (100–300 km), emphasizing their sensitivity to magnetic-field-aligned sheared flows and their relevance to ionospheric remote-sensing observations.
In the second part, I will discuss ion-cyclotron (IC) frequency-range instabilities in the topside ionosphere (300–500 km), where shear flows and parallel electron currents lead to strong electromagnetic turbulence and enhanced ion heating.
These results are based on recent theoretical developments presented in a series of our papers published in Physics of Plasmas and related journals, exploring shear-driven coupling between ITG and IC regimes and providing new insights into the mechanisms of anomalous ion energization in space plasmas.
The seminar offers a unified perspective on shear-induced ITG and IC processes across different ionospheric regions.