Special Issue

Multiscale Physics Phenomena and Near-Wall/Electrode Effects in Non-thermal Plasmas

Message from the Guest Editors

Cold, non-equilibrium plasma discharges are crucial for material processing, plasma propulsion, plasma medicine, and catalysis for gas conversion. Understanding the interplay of processes at various length scales and electrode boundaries is fundamental. For instance, in a capacitively coupled discharge, electrons move via ambipolar diffusion over large-scale bulk plasma, but exhibit different behavior near electrodes and reactor walls. Energy transport from small to large lengths can create spoke structures in magnetized ExB plasmas, demonstrating multiscale interactions found in most plasma discharges. Discovering scaling laws is vital for industrial upscaling of plasma film deposition and miniaturization for atmospheric micro-plasma jets. Modeling plasma processes with different power supplies can lead to better understanding and predictability of plasma properties.

The Special Issue invites research on plasma science and technology linking different length scales, offering innovative results at the forefront of multiscale plasma physics and applications. Combination of plasma diagnostics with data-driven models is expected to be transformative.

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Editor-in-Chief

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