

Materials Science Colloquia 2022-23

Research on 2D superconductivity using multi-functionality of ion-gating devices*

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Abstract

The ionic gating using the electric double layer transistor (EDLT) structure is a convenient technique to access the clean 2D superconducting states. The electrostatically doped surfaces in EDLT have shown novel superconducting phenomena, such as the quantum metallic state in the vortex state, the giant in-plane critical magnetic field exceeding the Pauli limit, and the non-reciprocal (diode-like) transport in the superconducting transition region. In addition, the electrochemical reactions, such as layer-by-layer etching and the precise intercalation, occurring beyond the electrostatic gating condition are other useful functions of EDLT.

In this seminar, I will first introduce the various methods to prepare the ion-gating (EDLT) devices, which depend on the shape and chemical stability of the samples, and then discuss our recent progress in the research on 2D superconductors using the multifunctionality of EDLT.

* The lecture will be delivered in English.

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