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سخنران: سهیل قدس

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عنوان سخنرانی:

2D Materials for Next-Generation Nanoelectronics

چکیده:

Two-dimensional (2D) materials have emerged as a promising platform for overcoming the scaling, power-consumption, and integration challenges facing next-generation electronic and optoelectronic technologies. Owing to their atomically thin nature, van der Waals interfaces, and highly tunable physical properties, 2D materials offer unprecedented opportunities for developing ultra-scaled devices, heterogeneous integrated systems, and intelligent sensing platforms. In this seminar, I will present our recent efforts toward the synthesis, characterization, and device applications of advanced 2D materials. First, I will discuss strategies for producing high-quality 2D crystals through both bottom-up growth and top-down layer-engineering approaches, including controlled atomic spalling for the scalable isolation of atomically thin materials. I will then introduce a non-destructive crystallographic analysis platform capable of mapping the structural quality of large-area 2D materials. The second part of the seminar will focus on contact engineering using topological and low-dimensional materials. By employing topological van der Waals contacts, semimetallic electrodes, and one-dimensional nanowire contacts, we demonstrate effective suppression of Fermi-level pinning, reduced contact resistance, and enhanced charge-carrier injection in 2D semiconductor devices. These advances enable high-performance electronic and optoelectronic functionalities, including photodetection and low-power operation.

Finally, I will highlight emerging opportunities at the intersection of artificial intelligence and 2D materials, including AI-assisted materials discovery, intelligent sensing, and miniaturized spectroscopic systems. The presented results illustrate how 2D materials can serve both as a foundation for future electronic hardware and as a key enabling technology for next-generation AI-integrated devices.

نحوه برگزاری سمینار: مجازی- برخط

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