DEPARTMENT OF PHYSICS
THE UNIVERSITY OF HONG KONG

Physics Colloquium

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Artificial Intelligence in Scientific Workflow

March 4, 2026 (Wednesday)

11:15 a.m.

CYCP1, LG1/F, Chong Yuet Ming Chemistry Building, Main Campus, HKU

Dr. Stanislav Kruchinin

Microsoft Austria

Abstract:

Neural networks have progressed beyond their original role as computational tools for pattern recognition and data analysis. Contemporary large language models are reshaping the scientific workflow, transforming it from a linear sequence into an autonomous, data-driven cycle of discovery. This talk will examine this paradigmatic shift in the context of nanostructure physics and ultrafast photonics. Specifically, I will discuss how AI facilitates the research process, ranging from automated retrieval and summarization of scientific literature to accelerated hypothesis generation, design of materials, and real-time analysis of ultrafast spectroscopy data. By integrating AI across the entire research pipeline—from literature review to experimental implementation and theoretical analysis—it becomes possible to accelerate discovery and open new avenues for scientific workflow.

Biography:

Dr. Stanislav Kruchinin is a Senior Applied Researcher at Microsoft Austria, specializing in speech recognition and synthesis. With over two decades of experience spanning both academia and industry, his current work focuses on the intersection of machine learning, digital signal processing, and large language models. Since joining Microsoft in 2023, he has been developing and fine-tuning deep neural networks for automatic speech recognition (ASR) and text-to-speech (TTS) models. Prior to his current role, Dr. Kruchinin worked as a Senior Applied Researcher at Nuance Communications, where he developed software for speech enhancement and microphone arrays. His industrial contributions are highlighted by several patents and conference papers. In the academic sphere, he was a Lise Meitner Fellow and Principal Investigator at the University of Vienna, where he led research of strong-field phenomena in dielectrics as open quantum systems. He worked for six years as a Postdoctoral Fellow at the Laboratory of Attosecond Physics in Max Planck Institute of Quantum Optics led by Prof. Ferenc Krausz. In the academic sphere, Dr. Kruchinin has pioneered research in ultrafast optical phenomena and strong-field electron dynamics in solids. His most influential contributions include a comprehensive Colloquium on strong-field phenomena in periodic systems published in Reviews of Modern Physics and seminal papers in various Nature and APS journals regarding ultrafast phenomena in solids, moiré excitons in van-der-Waals heterostructures, and resonant energy transfer in quantum dots.

Anyone interested is welcome to attend.

Enquiries:
Tel: 3917 2360 Fax: 2559 9152 Email: physdept@hku.hk