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# PHYSICS SEMINAR SERIES

**TOPIC:** Electronic and Magnetic Structure Engineering of 5d Iridates by Atomically-precise Thin Film Growth

**SPEAKER:** Yuefeng Nie,  
National Laboratory of Solid State Microstructures, College of Engineering and Applied Sciences, and Collaborative Innovation Center of Advanced Microstructures, Nanjing University

**TIME:** 1:15-2:15pm, Friday, April 13, 2018

**VENUE:** Room 302, Pudong Campus, NYU Shanghai  
(上海纽约大学浦东教学楼世纪大道 1555 号 302 室)

Broadcasting Room 375, Geography Building, Zhongbei Campus, East China Normal University  
(直播教室: 华东师范大学中山北路校区, 地理楼 375 室)

**HOST:** Hanghui Chen, NYU Shanghai

## ABSTRACT OF THE TALK

Layered iridates,  $\text{Sr}_{n+1}\text{Ir}_n\text{O}_{3n+1}$ , have drawn great attention since they share remarkable similarities with high- $T_c$  cuprates, including layered crystalline structure, (pseudo) spin  $\frac{1}{2}$  states, antiferromagnetic (AFM) Mott insulating ground state, Fermi arcs, and V shape energy gap. Nonetheless, direct evidences of superconductivity such as zero resistivity and Meissner effect are still lacking up to date. The strong spin-orbit coupling in 5d iridates results in a canted AFM ground state with weak ferromagnetic moments in each  $\text{IrO}_2$  plane. Here, we propose to suppress the weak ferromagnetism by suppressing the octahedral rotations in iridates, which may facilitate the Cooper pairing. By a combination of reactive molecular beam epitaxy (MBE), *in situ* angle-resolved photoemission spectroscopy (ARPES) and first principle calculations, we investigate the evolution of octahedral rotations, magnetic and electronic structure in epitaxial ultra-thin  $\text{SrIrO}_3$  films grown on (001)  $\text{SrTiO}_3$  substrate. Our experimental results and theoretical calculations show that octahedral rotations and weak ferromagnetic moments are fully suppressed in bilayer and single-layer  $\text{SrTiO}_3$  films through interfacial clamping effects, which sheds light on the exploration of high- $T_c$  superconductivity in 5d iridates.

## **BIOGRAPHY**

Yuefeng Nie, Professor in National Laboratory of Solid State Microstructures, College of Engineering and Applied Sciences at Nanjing University. In 2011, Dr. Nie received his Ph. D. degree in the department of physics at the University of Connecticut. After that, he spent about 4 years as a research associate at Cornell Center for Materials Research at Cornell University. In 2015, Dr. Nie joined Nanjing University through the “Your Thousand Talent Program”. His research interests mainly focus on strongly correlated phases in complex oxide thin films by a combination of molecular beam epitaxy (MBE) and angle-resolved photoemission spectroscopy (ARPES). Up to date, Dr. Nie has published more than 20 high profile articles in PRL, Nature and its sub journals.