



复旦大学物理系 Colloquium

Time: 16:00, Tuesday, 2024.11.26

Location: C108, Jiangwan Physics Building

Quantum magnetic exciton in Van der Waals antiferromagnet NiPS₃

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Abstract: Van der Waals magnets have been increasingly attracting huge interest in material science since several successful reports of monolayer magnetic systems were first published in 2016 by my group. This new class of materials has been used to test some fundamental theorems of two-dimensional magnetism and novel applications. NiPS₃ is a member of well-known antiferromagnets, TMPS₃ with TM=Mn, Fe, Co, and Ni, which are good experimental demonstrations of Ising, XY, and Heisenberg models. NiPS₃ is the first material produced on a monolayer among van der Waals magnets and displays a clear sign of Mott physics, i.e., a strong spin-charge coupling. Another interest of NiPS₃ is that it exhibits a striking magnetic exciton below $T_N=155$ K, which is both coherent and strongly polarised. With many-body calculations, we could demonstrate that it arises from the quantum entangled states of the Zhang-Rice triplet/singlet states. However, some questions remain about exciton, such as the doping effect. I will discuss some recent results and the remaining questions in this talk.



Biography: Prof. Je-Geun Park is a professor in the Department of Physics & Astronomy at Seoul National University. He earned his B.Sc. and M.Sc. from Seoul National University and his Ph.D. in Physics from Imperial College London in 1993. His research focuses on quantum materials, strongly correlated systems, and 2D van der Waals materials. Prof. Park has received numerous prestigious awards, including the POSCO TJ Park Science Award and the Korea Science Award. He has published extensively, with over 200 papers in leading journals including but not limited to *Nature*, *Nature Materials*, and *Physical Review Letters*.