



Special Seminar

Excitonic Insulator Transition and Superconductivity in Ta_2NiSe_5

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Time: 10:00am, Nov. 14, 2017 (Tuesday)

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Venue: Room W563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

The excitonic insulator is a long conjectured correlated electron phase of narrow gap semiconductors and semimetals, driven by weakly screened electron-hole interactions. Having been proposed more than 50 years ago, conclusive experimental evidence for its existence remains elusive. Ta_2NiSe_5 with layered structure consisting of one dimensional Ta double chains and Ni chains is a narrow gap semiconductor with a small one-electron band gap E_G of less than 50 meV. In this talk, we show experimental evidences that a transition to an excitonic insulator with an excitonic gap of ~ 0.2 eV is realized at $T^*=328$ K. We also discuss the discovery of superconductivity with a maximum $T_{SC} \sim 1.2$ K at the excitonic critical point under pressure.

About the speaker

Hidenori TAKAGI, born March 20 1961 in Tokyo, is a Director and Scientific Member of the Max Planck Institute for Solid State Research in Stuttgart, and a Professor of Physics at the University of Tokyo. He studied Applied Physics at the University of Tokyo, where he received his PhD in 1989. After joining AT&T Bell Laboratories as a Post-Doctoral member of technical staff in 1990, he returned to the University of Tokyo, becoming an Associate Professor in 1994 and a Professor in 1999. In 2002, he was jointly appointed at RIKEN, Japan as a Chief Scientist and Group Director. In 2013, he became a Director of the Max Planck Institute for Solid State Research. His research interests include the metal-insulator transition, superconductivity, and quantum magnetism in correlated transition metal oxides. He received the IBM science prize (1988), Nissan science prize (1994), K. H. Onnes prize (2006), Honda Frontier Award (2009), and is a Fellow of the American Physical Society. In 2013 he was appointed Alexander von Humboldt Professor.