北京大学量子材料科学中心

International Center for Quantum Materials, PKU

Seminar

Emergent electromagnetic responses from magnetic topological materials based on complex tellurides

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Time: 10:00 am, Oct. 18, 2023 (Wednesday)

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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 topology of spin texture either in momentum space and real space can generate emergent electromagnetic fields acting on the conduction and valence electrons in solid, producing emergent properties and responses. One archetypical example is magnetic topological insulators, in which the spin-momentum locking as well as the magnetization-induced mass-gap shows up to form the ideal Weyl (spin-momentum locked) fermion system at surface. With independent control of the magnetizations on the top and bottom surfaces, quantum anomalous Hall state, quantum magnetoelectric (axion insulator) state and parity-anomaly (half Hall quantization) state can be realized. Therein, many intriguing phenomena of topological origins show up, such as topological magneto-optical effects, nonreciprocal charge transport, magnetically induced photovoltaic (injection current) effect, quantized chiral edge conduction on magnetic domain walls, ultra-low-current induced magnetization reversal, and emergent electromagnetic induction. We argue the topological phase transformations as well as the related topological quantum functions based on magnetic topological insulators.

About the speaker

Yoshinori Tokura received his BSc in applied physics from University of Tokyo in 1976, and Ph.D. in applied physics from University of Tokyo 1981. From 1986 to 1993, he was an associate professor, and from 1994 to 1995 a full professor, at Dept. of Physics, University of Tokyo. From 1995 to 2019, he was a professor at Dept. of Applied Physics, University of Tokyo, and he is from 2017 to present, Distinguished Professor, and from 2019 to present the Special University Professor Emeritus, University of Tokyo. He is now Director of RIKEN Center for Emergent Matter Science (2013 – Present). In 2022, he was elected a member of the Japan Academy. His research interests include strongly correlated electrons including transition metal oxides, electronic processes in organic materials, topological aspects of condensed matters, spintronics, and optical properties of solids.