复旦大学物理系 物质科学报告

Time: 2:00pm, Tuesday, 2017.10.31

Location： Physics Building, Room 221B

Orbital angular momentum in materials with strong spin-orbit coupling and its connection to Berry curvature

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Orbital angular momentum is often quenched in solids due to the crystal field and thus often neglected. The situation is quite different for high Z materials (e.g., topological insulators) for which the atomic spin-orbital coupling is large. In such cases, it is energetically more advantageous to have orbital angular momentum.

It is found that the orbital angular momentum can significantly affect the electronic structure. When it is combined with the crystal momentum, orbital angular momentum induces momentum dependent electric polarization which, in combination with the electric field from an inversion symmetry breaking, can produce a large energy term.

The new energy term is found to play the key role in Rashba states (therefore in the surface states of topological insulators). In a more general term, orbital angular momentum is connected to Berry curvature in solids, leading to novel phenomena. Experimental and theoretical evidences for the existence of the orbital angular momentum will be presented. It will also be shown that such orbital angular momentum is crucial to the spin Hall effect.

Pro. Changyoung Kim

EDUCATION:

- Seoul National University, B.A. in Physics, 1988
- Stanford University, M.S. in Applied Physics, 1990
- Stanford University, Ph.D. in Applied Physics, 1995

APPOINTMENTS:

- Associate Director, Center for Correlated Electron Systems, 2015 - Present
- Professor, Departments of Physics, Seoul National University, 2015 - Present

POSITIONS:

- Editorial board member, Journal of Analytical Science and Technology, 2010 – present
- Vice-president, Korean Superconductivity Society, 2017 – present