Weekly Seminar

Materials design of transition metal oxide heterostructures: emergent phenomena and properties

Hanghui Chen
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Time: 4:00 pm, April. 1, 2015 (Wednesday)
时间：2015年4月1日（周三）下午 4:00
Venue: Room W563, Physics Building, Peking University
地点：北京大学物理楼 西563

Abstract

Transition metal oxides manifest many intriguing properties, including metal-insulator transition, colossal magnetoresistance and high temperature superconductivity. With the advances in thin film growth techniques, we can now grow an artificial heterostructure of transition metal oxides with atomic precision. By materials design of a heterostructure, we can theoretically predict and experimentally realize emergent physical properties that are lacking in bulk constituents. In my talk, I will show you the general principles of materials design and demonstrate by specific examples emergent electronic [1], magnetic [2] and orbital properties [3,4] of transition metal oxide heterostructures.

[1] H. Chen, A. J. Millis and C. A. Marianetti, Phys. Rev. Lett. 111, 116403 (2013)
[2] H. Chen, H. Park, A. J. Millis and C. A. Marianetti, Phys. Rev. B 90, 245138 (2014)
[3] H. Chen, D. Kumah, A. Disa, F. J. Walker, C. H. Ahn, and S. Ismail-Beigi, Phys. Rev. Lett. 110, 186402 (2013)
[4] A. S. Disa, D. P. Kumah, A. Malashevich, H.Chen, D. A. Arena, E. D. Specht, S. Ismail-Beigi, F. J. Walker, and C. H. Ahn, Phys. Rev. Lett. 114, 026801 (2015)

About the Speaker

Hanghui Chen earned his B.S. in physics from Peking University and received his Ph.D in physics from Yale University in 2012. He is now a postdoctoral fellow in the Department of Physics at Columbia University, working with Professor Andrew Millis. In his thesis, Hanghui used ab initio calculations to study emergent properties at transition metal oxide interfaces. His current research interests are computational design of strongly correlated materials in bulk and nanostructured forms, using state-of-the-art first-principles methods and supercomputers.