

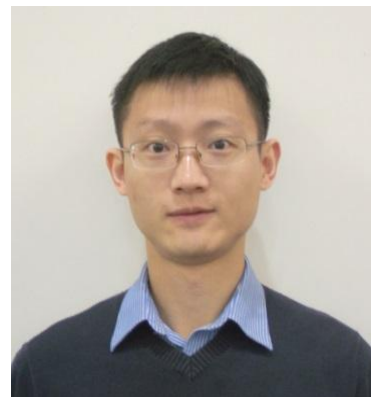


Seminar

Some Geometrical and Topological Aspects of Valley Physics

Shengyuan Yang

Singapore University of Technology and Design



Time: 4:00pm, 21 May, 2015 (Thursday)

时间: 2015年05月21日 (周四) 下午4:00

Venue: Room W563, Physics Building, Peking University

地点: 北京大学物理楼 W563

Abstract

Valleytronics, a concept analogous to spintronics, aims to utilize carriers' valley degree of freedom to store and manipulate information. This field has been rapidly developed in recent years since the discovery of graphene and other novel two-dimensional materials. In these materials, there are multiple Dirac-type valleys in the low-energy band structure which are connected by symmetry. Carriers in each valley have definite chirality. These give rise to many interesting valley physics. I will introduce our recent theoretical studies in this field, focusing on the geometrical and topological aspects of Dirac valleys, e.g., using external fields to control valley degree of freedom, designing topological domain wall based valley filters, and proposing some novel valley-related topological phases.

About the speaker

Shengyuan Yang is from Nanjing. He obtained Bachelor's degree in Mathematics/Physics from The University of Hong Kong in 2005, and he obtained his PhD degree from The University of Texas at Austin in 2011. Dr. Yang's research is mainly on the electronic, magnetic, and transport properties of nanostructures and novel materials. The topics that he has worked on include the electromotive force induced by magnetic dynamics, the theory of optical second harmonic generation, electronic properties of 2D materials such as graphene, silicene, transition metal dichalcogenides etc., pumping effects in quantum dot structures, design of magnetic nano-devices, the effects of disorder scattering on transport and magnetic properties. He worked as an imaging geophysicist in CGG (US) Services at Houston from 2011 to 2013. He joined the Singapore University of Technology and Design (SUTD) as an assistant professor in 2013.