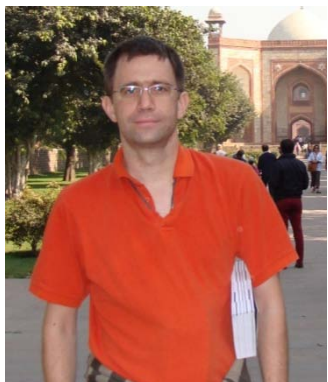




中心系列讲座 ICQM Weekly Seminar Series

“Valley-based noise-resistant quantum computation using Si quantum dots”



Dimitrie Culcer(文长奇)
University of Science and
Technology of China

Time: 4:00pm, Nov. 23, 2011 (Wednesday)

时间: 2011年11月23日 (周三) 下午4:00

Venue: Room 607, Conference Room A, Science Building 5

地点: 理科五号楼607会议室

Abstract

I will discuss a platform for noise-resistant quantum computing using the valley degree of freedom of Si quantum dots. The qubit is encoded in two polarized (1,1) spin-triplet states with different valley compositions in a double quantum dot, with a Zeeman field enabling unambiguous initialization. A top gate gives a difference in the valley splitting between the dots, allowing controllable interdot tunneling between opposite valley eigenstates, which enables one-qubit rotations. Two-qubit operations rely on a stripline resonator, and readout on charge sensing. Sensitivity to charge and spin fluctuations is determined by intervalley processes and is greatly reduced as compared to conventional spin and charge qubits. I will also describe a valley-echo experiment for further noise suppression.

About the Speaker

Prof. Culcer received his both Bachelor and Master degrees in physics from University of Oxford in 2000 and his Ph.D. in physics from University of Texas at Austin in 2005. After working as a postdoctoral researcher at Argonne National Laboratory and University of Maryland at College Park, he became a professor at University of Science and Technology of China in 2010. His current research interests include quantum computing with quantum dots and topological insulator.