Seminar

Optical Manipulation of Electron and Nuclear Spin in single quantum dot

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Time: 4:00pm, May 27, 2013(Monday)

时间： 2013年5月27日（周一）下午4:00

Venue: Conference Room 607, Science Building 5

地点： 理科五号楼607会 室

In recent years, the interest in studying quantum-dot nuclear spin systems and their coupling to confined electron spins has been further fueled by its importance for possible quantum information processing applications. In the first part of this talk, experimental work performed over the last decade in studying this mesoscopic, coupled electronuclear spin system is reviewed, with special focus on how optical addressing of electron spins can be exploited to manipulate and read out the quantum-dot nuclei [1].

The second part of the talk will be devoted to the generation of entangled photon pairs. We create a naturally symmetric quantum dot cascade that emits highly polarization entangled photon pairs on demand. The emitted photons strongly violate Bell's inequality [2]. The source consists of strain-free GaAs dots grown by Droplet Epitaxy on a triangular symmetric (111)A surface [3]. The remaining decoherence channel of the photon source is ascribed to random charge and nuclear spin fluctuations in and near the dot, which will be discussed.

[1] B. Urbaszek, X. Marie, T. Amand, O. Krebs, P. Voisin, P. Maletinksy, A. H?gele, A. Imamoglu, Rev. Mod. Phys. 85, 79 (2013)

[2] T. Kuroda et al, arxiv 1302.6389 (2013)

[3] G. Sallen, et al, Phys. Rev. Lett. 107, 166604 (2011) ; M. Durnev et al, Phys.Rev.B 87, 085315 (2013).

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Prof. Xavier MARIE got his master degree from University of Essex(G.B) in 1989 and his Ph.D from