

# 凝聚态物理-北京大学论坛

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## Single semiconductor quantum dot based quantum information processing

许秀来 研究员

时间：11月27日（星期四）下午15:00—16:30

地点：北京大学物理大楼中212教室

**许秀来**，中国科学院物理研究所研究员、博士生导师，课题组长。1996年毕业于吉林大学电子工程系。1999年在中国科学院长春光机与物理研究所获得硕士学位。2005年于剑桥大学卡文迪许实验室获得博士学位。2005-2011年在日立剑桥实验室先后担任博士后研究员、终身研究员和高级研究员。2009-2011年兼任剑桥大学CLARE HALL学院的RESEARCH FELLOW。2011年入选中国科学院‘百人计划’任特聘研究员，2014年被评为中科院物理所研究员。已经在Nature Physics, Nano Letters, Physics Review B, Applied Physics Letters等杂志发表文章45篇，共被引用近500次，申请欧洲专利2项。

**Abstract:** Self-assembled InAs/GaAs quantum dots are very promising candidates to implement solid-state quantum information and quantum computation. In this talk, we will be presenting our recent progress on the single charge and spin control in single quantum dots using external applied electric and magnetic fields. For a pure pyramidal quantum dot, the hole wave function always occupies the base because of less confinement at base than that at apex, which induces a permanent dipole oriented from base to apex. In this type of dots, the carrier wave function can be controlled longitudinally with the applied magnetic field. With increasing the pumping power, strong correlation between single quantum dots and the wetting layer based two-dimensional electron gas is observed, resulting an abnormal diamagnetic effects. Finally, we will discuss the scaling up of the single quantum dot based quantum information processing by integrating quantum dots with photonic crystal cavities.

联系人: 王新强 研究员

邮箱: wangshi@pku.edu.cn