



中心系列讲座 ICQM Weekly Seminar Series
“Spin dependent transport across Fe|MgO|Fe
tunnel junction”



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Time: 4:00pm, Sep. 21, 2011 (Wednesday)

时间: 2011年9月21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

Recently experimental and theoretical studies focusing on thermal (spin caloritronics) effects on MgO based tunnel junctions have attracted considerable interesting. Evidence for thermally induced spin transfer torque has been observed in spin valves. In this talk, we will report calculations of the thermoelectric transport properties for a Fe|MgO|Fe tunnel junctions based on realistic electronic structures. We demonstrate that the thermal spin-transfer torque (TST) in a junction with 3 MgO monolayers amounts to 10^{-7} J/m²/K at room temperature, which is estimated to cause magnetization reversal for temperature differences over the barrier of the order of 10 K. The large TST for ultrathin barriers can be explained by multiple scattering between interface states. Under ambient temperatures the angular dependence of the in-plane spin transfer torque is very asymmetric, which can lead to thermally induced high-frequency generation.

About the Speaker

夏钊, 1997年南京大学物理系理学博士。2002年入选中国科学院百人计划, 2008国家杰出青年科学基金获得者。历任物理研究所副研究员、研究员。2009年调入北京师范大学物理系。研究方向为纳米体系自旋电子输运的第一性原理计算。自行发展了基于第一原理计算纳米体系电子输运的理论方法, 研究了磁性多层膜的界面电阻, 自旋极化电流对磁矩的转矩(spintorque), 铁磁/超导体界面的Andreev反射。夏钊博士在SCI收录的杂志上发表文章四十余篇。