北京大学量子材料科学中心
International Center for Quantum Materials, PKU

Seminar

Switching magnon chirality in artificial ferrimagnet

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Abstract

Chirality, an intrinsic degree of freedom, has been barely exploited as the information carriers in data transmission, processing, computing, etc. Recently the magnons in antiferromagnets were proposed to carry both right-handed and left-handed chiralities, shedding a light on chirality-based spintronics in which chirality-based computing architectures and chiral magnonic devices may become feasible. However, the practical platform for chirality-based spintronics remains absent yet. Here we report an artificial ferrimagnetic Py/Gd/Py/Gd/Py/Pt multilayer by which the switching, reading, and modulation of magnon chirality are demonstrated. In particular, the coexisting resonance modes of ferromagnetic and antiferromagnetic characteristics permit the high adjustability and easy control of magnon chirality. As a main result, we unambiguously demonstrated that Py precessions with opposite chiralities pump spin currents of opposite spin polarizations into the Pt layer. Our result manifests the chirality as an independent degree of freedom and illustrates a practical magnonic platform for exploiting chirality, paving the way for chirality-based spintronics.

About the Speaker

栗佳，2005年和2010年分别获复旦大学学士和博士学位。2010年至2015年在美国加州大学伯克利分校做博士后研究。2016年获海外高层次人才计划（青年）支持，加入北京大学量子材料科学中心工作。主要研究方向包括（1）各类磁性材料的磁动力学性质研究，重点研究与自旋流相关的物理现象；（2）人工磁性纳米结构的拓扑磁性和拓扑操控；（3）磁性氧化物薄膜的磁结构及自旋阻挫等等.