

2009 25

# 纳米体系自旋极化电子输运 第一原理计算

1997

1998–2002

2002

2008

2009

(spintorque)

Andreev

, Nature Nano. PRL

**Abstract** Spin angular momentum can be transferred by the flowing electrons from one ferromagnetic(FM) material to another FM material, which is the so-called spin-transfer torques(STT) introduced by Slonczewski and Berger. Those two seminal studies have shown that the dynamics of magnetization in FM material could be dominated by the spin torques carried by electric current. An efficient first-principles method based on LMT0 was developed to calculate spin-transfer torques in layered system with noncollinear magnetization. We applied our method to the ferromagnetic spin valve and magnetic domain walls. In addition, we matching the wave function in the present of Andreev reflection, the obtained scattering wave function allowed us to study the spin-transfer torques in ferromagnet and superconductor hybridized system.