Abstract Submitted
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Gate-driven pure spin current in graphene[1] XIAOYANG LIN, LI SU, YOUGUANG ZHANG, Beihang Univ., ARNAUD BOURNEL, CNRS/Univ. of Paris-sud, YUE ZHANG, Beihang Univ., JACQUES-OLIVIER KLEIN, CNRS/Univ. of Paris-sud, WEISHENG ZHAO, Beihang Univ., ALBERT FERT, Unit Mixte de Physique CNRS-Thales — An important challenge of spin current based devices is to realize long-distance transport and efficient manipulation of pure spin current without frequent spin-charge conversions. Here, the mechanism of gate-driven pure spin current in graphene is presented. Such a mechanism relies on the electrical gating of conductivity and spin diffusion length in graphene. The gate-driven feature is adopted to realize the pure spin current demultiplexing operation, which enables gate-controllable distribution of the pure spin current into graphene branches. Compared with Elliot-Yafet spin relaxation mechanism, D'yakonov-Perel spin relaxation mechanism results in more appreciable demultiplexing performance, which also implies a feasible strategy to characterize the spin relaxation mechanisms. The unique feature of the pure spin current demultiplexing operation would pave a way for ultra-low power spin logic beyond CMOS. [1] L. Su, X. Lin, W. Zhao, A. Fert, et al., arXiv:1608.05132.

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