Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

All-electrical control of RKKY interaction in graphene P-N junction SHUHUI ZHANG, WEN YANG, Beijing Computational Science Research Center, KAI CHANG, Institute of Semiconductors, Chinese Academy of Sciences — Graphene is a promising material for spintronic devices. In this development, one way is to dope graphene with magnetic impurity spins. Controllable long-range coupling between different spins is a key ingredient for these applications. The electron-mediated RKKY interaction provides a possible solution. However, there lacks efficient way to control this interaction. Here we demonstrate that by focusing the electron waves across a P-N junction, the long-range RKKY interaction can be controllably amplified by electrical gating. This provides a possible route towards scaling up graphene-based spintronic devices.

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Date submitted: 13 Nov 2014 Electronic form version 1.4