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Spin Transfer Torque in Graphene CHIA-CHING LIN, ZHIHONG CHEN, Purdue University — Graphene is an idea channel material for spin transport due to its long spin diffusion length. To develop graphene based spin logic, it is important to demonstrate spin transfer torque in graphene. Here, we report the experimental measurement of spin transfer torque in graphene nonlocal spin valve devices. Assisted by a small external in-plane magnetic field, the magnetization reversal of the receiving magnet is induced by pure spin diffusion currents from the injector magnet. The magnetization switching is reversible between parallel and antiparallel configurations by controlling the polarity of the applied charged currents. Current induced heating and Oersted field from the nonlocal charge flow have also been excluded in this study. Next, we further enhance the spin angular momentum absorption at the interface of the receiving magnet and graphene channel by removing the tunneling barrier in the receiving magnet. The device with a tunneling barrier only at the injector magnet shows a comparable nonlocal spin valve signal but lower electrical noise. Moreover, in the same preset condition, the critical charge current density for spin torque in the single tunneling barrier device shows a substantial reduction if compared to the double tunneling barrier device.

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