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Is Coulomb scattering important for spin relaxation in graphene KEYU PI, University of California, Riverside, WEI HAN, KATHY MCCREARY, YAN LI, ADRIAN SWARTZ, ROLAND KAWAKAMI — Due to the low intrinsic spin-orbit and hyperfine couplings, graphene is expected to have long spin lifetime up to μs regime. Even though spin transport in graphene has been demonstrated at room temperature, the reported spin lifetime has never achieved over one nanosecond. Because recent experiments find that the primary source of spin relaxation is momentum scattering and the dominant source of momentum scattering is believed to be the charged impurity scattering, it is reasonable to assume that charge impurity scattering is an important factor for spin relaxation. To study this unexpected short spin lifetime, we investigate the effects of charged impurity scattering on spin relaxation by systematically introducing gold impurities onto graphene spin valves. We find that Au impurities on graphene do not generate the dominant spin relaxation. In addition, Au impurities are found to slightly enhance the spin lifetime ($\sim$10%). This result suggests a new direction to study the spin relaxation in graphene.

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