Abstract Submitted
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Magnon excitation and transport in Ferromagnetic Insulator/metal multilayers[1] TAO LIU, JIE REN, JIANWEI ZHANG, School of Physics, Tongji University — We studied magnon excitation and transport in a Ferromagnetic Insulator(FI) layer(such as YIG), which connected with Ferromagnetic/normal metal multilayers in two sides. In our modeling, we adopted self-consistent spin dependent Boltzmann equations in metal layers and magnon Boltzmann equation in FI layer. When applying an in-plane current in FM layer, a transverse spin current was generated due to Anomalous Hall effect, after crossing normal metal layer, it will produce magnon excitation at N/FI interface. With carrying spin information, magnon excitation in FI can eventually excite a new spin current at second F/N interface. This is so call magnon-drag effect [1]. In our work, we focused on magnon propagation in FI, with all two-magnon, three magnon, and four magnon scattering. Associated with spin dependent Boltzmann equation, we can investigate magnon excitation and transport properties in FI layer from the interface to bulk scale. The magnon excitation in FI layer is dominated not only by the interface interaction at Normal/FI boundary, but also by the bulk scattering in FI. Our results show the magnon in FI layer has decay behaviors to low energy model. We also showed a new way to manipulate magnon transport in FI. [1] S.L. Zhang and S. Zhang, PRL,109,096603(2012)

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