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Suppression of spin relaxation due to weak localization in multilayer graphene spin valves TAKEHIRO YAMAGUCHI, IIS, Univ. of Tokyo, SATORU MASUBUCHI, IIS and INQIE, Univ. of Tokyo, KAZUYUKI IGUCHI, RAI MORIYA, IIS, Univ. of Tokyo, TOMOKI MACHIDA, IIS and INQIE, Univ. of Tokyo, and PRESTO-JST — Graphene is a promising material for spintronics devices because of its long spin diffusion length. In addition, graphene is a fascinating system where quantum interference phenomena such as weak localization and Fabry-Perot interference can be observed because of its long phase coherent length at low temperature. Therefore, graphene is an ideal system for exploring the physics of spin transport and spin relaxation under the phase coherent system. In this study, we fabricated multilayer graphene spin valve devices [1] and investigated temperature dependence of spin transport and spin relaxation properties. Spin relaxation time obtained by Hanle effect with nonlocal geometry was found to start increasing below 70 K and reach 2.5 ns at 2 K. Under the same temperature range, we also found weak localization emerged. These results suggest the correlation of spin relaxation and phase coherent transport in graphene [2]. [1] T. Yamaguchi et al., J. Magn. Magn. Mater. 324, 849 (2012), [2] T. Yamaguchi et al., submitted

Takehiro Yamaguchi
IIS, Univ. of Tokyo

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