

Gate-tunable Spin Transport and Spin Conversion in SemiconductorsM. Shiraishi*Department of Electronic Science and Engineering, Kyoto Univ., Kyoto, Japan.*

Gate-tunability of spin transport is one of the most important milestones in spintronics using non-metallic materials, as in the case of that of charge transport in modern electronics. One attractive example is modulation of spin transport signals in non-degenerate Si, enabling Si spin MOSFETs [1-3]. At present, the room temperature operation of Si spin MOSFET was realized [1] and large on/off ratio of spin signals was achieved [2]. This technique can be also used for modulation of spin conversion, which is the inter-conversion of spin current and charge current. In fact, gate-induced ambipolar spin conversion was realized in single-layer graphene [4]. Furthermore, the gate-tunability allows determining a spin conversion mechanism in single-layer graphene to be the inverse spin Hall effect, not the inverse Rashba-Edelstein effect. In this presentation, I will introduce the detail of these studies and related topics of spin transport in a semiconductor and an oxide heterostructure [5,6].

References

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