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Anomalous Hall effect and persistent current due to spin chirality in a diffusive regime KAZUKI NAKAZAWA, HIROSHI KOHNO, Department of Physics, Nagoya University, CONDENSED-MATTER THEORY TEAM — It is known that a non-coplanar spin configuration having spin chirality gives a Berry phase to electrons through the exchange interaction, leading to anomalous Hall effect (AHE). Tatara and Kawamura showed that AHE can result without the concept of Berry phase by treating the exchange coupling perturbatively in a model with discretely distributed spins [1]. Recently, we reexamined the AHE in the same model by considering vertex corrections due to normal impurities [2]. This amounts to electron's diffusive motion and spin conservation at the scattering from normal impurities, and leads to the expression of AH conductivity which satisfies spin conservation. We also investigated a persistent current around the spin chirality as a physical origin of the AH response, and we found that the “typical” value of the persistent current reproduces the AH conductivity in the diffusive regime.

[1] J. Phys. Soc. Jpn. **71**, 2613 (2002)

[2] J. Phys. Soc. Jpn. **83**, 073707 (2014)

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