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Chirality-induced anomalous Hall effect: Bridging a gap between weak and strong coupling KAZUKI NAKAZAWA, HIROSHI KOHNO, Department of Physics, Nagoya University, Japan — A non-coplanar spin configuration, which has finite spin chirality, is known to cause anomalous Hall effect (AHE) [1]. Usually it is discussed in terms of a fictitious magnetic field due to Berry phase, which is appropriate when the s-d exchange coupling between conduction electrons and magnetization is strong (strong coupling regime). On the other hand, in the case of weak coupling, it cannot be described by the Berry phase since the adiabatic condition fails [2]. In this study, we examined the chirality-driven AHE in the weak coupling regime by two methods; 1) treating the exchange coupling perturbatively, 2) employing gauge field method [3]. It is known that the adiabatic component (diagonal part in spin space) of the SU(2) gauge field contributes dominantly in the strong coupling regime. We investigated whether or not the two results coincide, and whether one can describe the weak and strong coupling regimes in a single framework. We find that the adiabatic and non-adiabatic components are both important in the weak coupling regime. [1] J. Ye *et. al.*, Phys. Rev. Lett. **83**, 3737 (1999). [2] K. S. Denisov *et. al.*, Phys. Rev. Lett. **117**, 027202 (2016). [3] G. Tatara, H. Kohno and J. Shibata, Phys. Rep. **468**, 213-301 (2008).

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