

Superconductivity without Local Inversion Symmetry; Multi-layer Systems

D. Maruyama^a, M. Sigrist^b, and Y. Yanase^a

^aDepartment of Physics, Niigata University, Niigata, Japan

^bTheoretische Physik, ETH Zurich, Zurich, Switzerland

Non-centrosymmetric superconductor has unique properties owing to the antisymmetric spin-orbit coupling (ASOC). One of them is the anomalous properties of spin susceptibility. It has been shown that the spin susceptibility is anisotropic for the direction of applied magnetic field.¹

Recently, artificial superlattices of the heavy fermion superconductor CeCoIn₅ and the conventional metal YbCoIn₅ attract many attentions. Two-dimensional multi-layer heavy electrons system has been realized in this system. We investigate this multi-layer system with focus on the local inversion symmetry breaking. We shed light on the effect of broken local inversion symmetry to the superconducting property.

We analyze two dimensional multi-layer systems with spatially inhomogeneous ASOC assuming superconducting order parameter with mixed parity. Roles of ASOC, the inter-layer coupling and the number of layer on the spin susceptibility are investigated at zero temperature. We show that the spin susceptibility is significantly affected by ASOC. This means that not only the broken global inversion symmetry but also the broken local inversion symmetry plays important roles on the superconductivity. The details will be discussed in the presentation.

¹P.A. Frigeri, D.F. Agterberg, and M. Sigrist: *New J. Phys.* **6** (2004) 115.