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Partial disorder in the periodic Anderson model on a triangular lattice SATORU HAYAMI, Dep. Appl. Phys., Univ. Tokyo, MASAFUMI UDAGAWA, Dep. Appl. Phys., Univ. Tokyo, MPI PKS, YUKITOSHI MOTOME, Dep. Appl. Phys., Univ. Tokyo
— In Kondo lattice systems, keen competition between the Kondo coupling and RKKY interaction leads to a quantum critical point between a magnetically-ordered state and a Fermi liquid state. This is a source of novel phenomena, such as a non-Fermi liquid behavior and a superconductivity. In the present study, we explore a new quantum phase related to the competition by introducing a new parameter, geometrical frustration of the lattice structure. Especially, we focus on the possibility of a partial disordered (PD) state, in which a magnetically ordered and nonmagnetic sites coexist. We consider a fundamental model for the rare-earth systems, a periodic Anderson model on a frustrated triangular lattice, and investigate the ground-state phase diagram by the Hartree-Fock approximation with assuming three-site unit cell. As a result, we find a PD state at half filling between a noncollinear antiferromagnetic metal and a Kondo insulator [1]. The PD state is stabilized by relaxing the frustration by forming collinear antiferromagnetic order on an unfrustrated honeycomb subnetwork, while leaving remaining sites non-magnetic. We will also discuss the effects of spin anisotropy and carrier doping to the PD state.

[1] S. Hayami, M. Udagawa, and Y. Motome, J. Phys. Soc. Jpn. 80, 073704 (2011).

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