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Frustrated Spins in a Metallic Pyrochlore

--Abstract--

Geometrical frustration effects in the metallic pyrochlore oxide Pr$_2$Ir$_2$O$_7$ are studied using single crystals. The low temperature magnetization and neutron measurements have revealed that the system has $<111>$ Ising spins with antiferromagnetic correlation of 19 K. However, no long-range order is detected except a weak freezing feature at 110 mK. The lnT dependence of the resistivity and its field suppression signals the Kondo coupling between Pr$^{3+}$ 4f localized moments and Ir 5d conduction electrons. The observed Kondo effect suggests that quantum fluctuations are enhanced because of partially screened 4f moments and thus promote strong frustration.