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Anomalous temperature dependence of electron conductivity in pyrochlore spin ice SHARMISTHA SAHOO, JING LUO, GIA-WEI CHERN, Univ of Virginia — The strong interaction between the conduction electron and local moments has been suggested to be the reason behind the anomalous behavior of the resistivity at low temperatures. Indeed, resistivity minimum observed in several itinerant magnetic systems has been attributed to the formation of a singlet state between conduction electrons and the magnetic impurity, a phenomena known as the Kondo effect. Recently, a non-Kondo mechanism has been proposed to explain a similar resistivity minimum observed in metallic spin ice [1,2]. In these theories, the resistivity upturn at low temperature is related to the nontrivial temperature dependence of spin correlation in the ice phase. Here we address this issue using the Ziman formula that relates the electron scattering to the spin correlation function. We calculate the correlation function analytically using the spherical approximation and high-T expansion approaches, the results are also compared with that obtained from direct Monte Carlo simulations. [1] M. Udagawa, H. Ishizuka, and Y. Motome. Phys. Rev. Lett. **108**, 066406 (2012). [2] G.-W. Chern, S. Maiti, R. Fernandes, and P. Wolfle, Phys. Rev. Lett. **110**, 146602 (2013).

Sharmistha Sahoo
Univ of Virginia

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