Spin dynamics in $Na_2Co_2TeO_6$ and implications for its magnetic model

Doc. Mgr. Jiří Chaloupka, Ph.D.
chaloupka@physics.muni.cz

Abstract

The idea of realizing the Kitaev honeycomb model in iridates and ruthenates with a d^5 valence configuration has attracted considerable interest over the past fifteen years. In these materials, the large spin-orbit coupling combines the spin and orbital moments into pseudospins-1/2, forming the basis of the magnetic model. Due to the orbital component, the superexchange interactions among the pseudospins acquire strong bond-selective anisotropy, which manifests itself in various experiments. In 2018, honeycomb cobaltates containing Co^{2+} ions with a $3d^7$ valence configuration were proposed as a viable alternative. Despite the significantly smaller spin-orbit coupling, strong bond-selective anisotropy of the pseudospin interactions is still expected in these systems. A number of candidate materials have been examined with the aim of quantifying their proximity to the Kitaev-model limit. In this talk, I will discuss the case of $Na_2Co_2TeO_6$ and the efforts to establish an appropriate magnetic model for this compound based on pseudospin dynamics observed via inelastic neutron scattering and magneto-optical measurements.