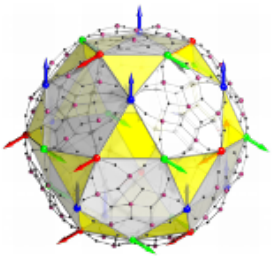

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Neutron scattering on a new Nd-pychlore single crystal

Thursday, 6 June 2019 17:34 (1 minute)

Pyrochlore Nd2Zr2O7 was found to have very special magnetic ground state in which there is a coexistence of dynamical spin-ice correlations and quantum moment fragmentation due to the dipolar-octupolar doublet ground state of Kramers Nd3+ ion. Through 1:1 mixing of Sc3+ and Ta5+ in B sites, the crystal field ground state of Nd3+ can be strongly affected, and the magnetic ground state of pyrochlore Nd2ScTaO7 is suggested to have rather different ground state with the case of pure Nd2Zr2O7. Polarized neutron diffuse scattering at 100 mK confrimed the long-range order together with strong diffuse scattering in the ground state. The strong diffuse scattering in the ordered state indicates a robust moment fragmentation even in the Sc-Ta mixing sample. More specially, clear mangetic peak at (0 0 2) below 500 mK suggested a different magnetic structure of Nd2ScTaO7 in comparision with the case of pure Nd2Zr2O7. It is concluded that doping in B sites is an effective method to modulate the magnetic ground state of Nd-pyrochlore, which can help to realize more novel quantum magnetism and collective excitations in this magnetically frustrated system.

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