

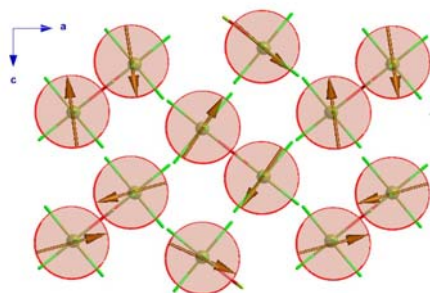
Incommensurate magnetic structure in a new multiferroic molecular magnet

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The family of antiferromagnetic $A_2[\text{FeCl}_5(\text{H}_2\text{O})]$ compounds (A = alkali metal or ammonium ion) has awakened a renewed interest owing to the recent observation of multiferroicity in some of its members.^{i,ii} We have recently investigated by means of single crystal and powder



superposition of the nuclear and magnetic structures of $(\text{ND}_4)_2[\text{FeCl}_5(\text{D}_2\text{O})]$. For the sake of clarity only $[\text{FeCl}_5(\text{D}_2\text{O})]$ units have been represented.

neutron diffraction the magnetic structure of $(\text{ND}_4)_2[\text{FeCl}_5(\text{D}_2\text{O})]$ (with properties completely equivalent to the hydrogenated form) in order to understand the underlying mechanism of multiferroicity in this compound. This material orders antiferromagnetically at $T_N = 7.25$ K and multiferroicity arises below *ca.* 6.9 K with the onset of ferroelectric order. We have observed at zero magnetic field a cycloidal magnetic structure propagating in the c -axis with $\mathbf{k} = (0, 0, 0.23)$ and with the magnetic moments lying in the ac plane (Fig.1). This cycloid would be at the origin of the magneto-electric coupling via inverse Dzyaloshinsky–Moriya interactionⁱⁱⁱ.

ⁱ Ackermann M, Brüning D, Lorenz T, Becker P and Bohatý L **2013** New J. Phys. *15* 123001

ⁱⁱ Ackermann M, Lorenz T, Becker P and Bohatý L **2014** ArXiv :1408.3997v1

ⁱⁱⁱ Velamazán et al. Scientific Reports | 5:14475 | DOI: 10.1038/srep14475

5 研究科共同セミナーの認定科目です

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