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Incommensurate Magnetic Structure of ZnCr_2Se_4 and ZnCr_2S_4

FABIANO

YOKAICHIYA,

Hahn-Meitner-InstitutHahn-Meitner-Institut, 100 Glienicker str, Berlin, Germany,
HELOISA NUNES BORDALLO, DIMITRI ARGYRIOU, Hahn-Meitner-Institut,
100 Glienicker str, Berlin, Germany, A KRIMMEL, A LOIDL, V TSURKAN, Ex-
perimental Physics V, Center for Electronic Correlations and Magnetism, Univer-
sity of Augsburg, D-86135Augsburg, Germany — Recent studies of chalcogenide
chromium spinels have shown a coupling between ferroelectricity and magnetism.
The motivation of this work is to determine the magnetic ground state, (including
its symmetry properties), to comprehend the coupling of magnetic and ferroelectric
order parameters in the spinels ZnCr_2Se_4 and ZnCr_2S_4 . The incommensurate mag-
netic structures through the Néel transition in these systems have been studied by
high-resolution powder neutron diffraction. Below T_N ($\sim 22\text{K}$), for both cases, the
magnetic structure is described as ferromagnetic layers in the **ab**-plane stacked in a
spiral arrangement along the **c**-axis with a propagation vector $\mathbf{k} = (0,0,\sim 0.46)$. In
 ZnCr_2Se_4 and ZnCr_2S_4 , the magnetic phase transition is of first order. Therefore
to use the irreducible co-representation theory, for symmetry analysis, the magnetic
phase is described by a linear combination of irreducible representations. In this
talk we present results of Rietveld analysis on the magnetic and crystal structure
through the magnetic transition.

Dimitri Argyriou

Hahn-Meitner-InstitutHahn-Meitner-Institut, 100 Glienicker str, Berlin, Germany

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