

Experimental report

03/03/2020

Proposal: EASY-496

Council: 4/2019

Title: Lattice and magnetic contribution in potential hybrid collective mode in GdMn₂O₅ multiferroic

Research area: Physics

This proposal is a new proposal

Main proposer: Victor BALEDENT

Experimental team: Victor BALEDENT
Antoine VAUNAT

Local contacts: Paul STEFFENS

Samples: GdMn₂O₅

Instrument	Requested days	Allocated days	From	To
THALES	24	24	02/09/2019	04/09/2019

Abstract:

GdMn₂O₅ multiferroic presents a collective mode around 4 meV seen in both infrared spectroscopy and neutrons scattering. Since this mode can be activated by electric field, it should present an NSF component together with the SF magnetic component. In this proposal we would like to disentangle these components.

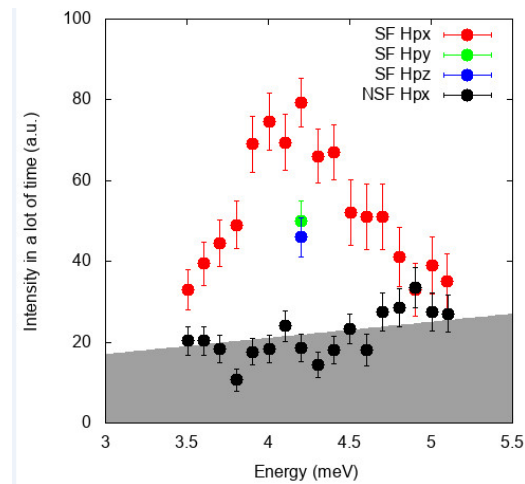
Beamtime report from THALES, experiment EASY-496

Antoine VAUNAT / Victor BALEDENT

Local contact: STEFFENS Paul

Sample : GdMn_2O_5 (Gd isotopic) mono-crystal, 100 mg.

We have highlighted that the excitation present in $\mathbf{q} = (0.5, 0, 0)$ at $E = 4.5 \text{ meV}$ is an electromagnon: Indeed it is an electroactive excitation in infrared (not yet published), living only below T_N . Polarized neutron measurements have allowed us to confirm the magnetic nature of the excitation; the entire signal is contained in the spinflip signal (cf fig.).



*Polarized INS scan in energy at $\mathbf{Q}=(3/2,0,0)$ at 15K with $k_f=1.5\text{\AA}^{-1}$. **Black**: nonspinflip & **Red**: spinflip.*