Experimental report

11/02/2025

Proposal: **EASY-951** **Council:** 10/2020

Title: Single crystal neutron diffraction of Ca3Ru2O7

Research area: Physics

This proposal is a new proposal

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Experimental team: Quentin FAURE

Local contacts: Oscar Ramon FABELO ROSA

Samples: Ca3Ru2O7

Instrument	Requested days	Allocated days	From	To
D9	96	96	06/09/2021	10/09/2021

Abstract:

In Ca3Ru2O7, a spin-reorientation transition (SRT) occurs at T = 48K where the spins reorient antiferromagnetically from the a-axis to the b-axis. It is believed that this SRT comes from the distortions of the RuO6 octahedra that evolve in temperature. This high-resolution single crystal neutron diffraction experiment intends to give an answer to this SRT by following the Ru-O lengths and O-Ru-O angles in temperature around this transition.

Experimental Report

Proposal **EASY-951**
Instrument : D9
Dates: 06/09/2021 to 10/09/2021

Single Crystal Neutron diffraction of $Ca_3Ru_2O_7$

In this experiment, we successfully probed the evolution of the crystallographic structure across the spin-reorientation transition occurring in $Ca_3Ru_2O_7$. The origin of this transition has been understood by lattice deformation, in particular of the subtle Ru-O-Ru angle changing through this spin-reorientation transition.

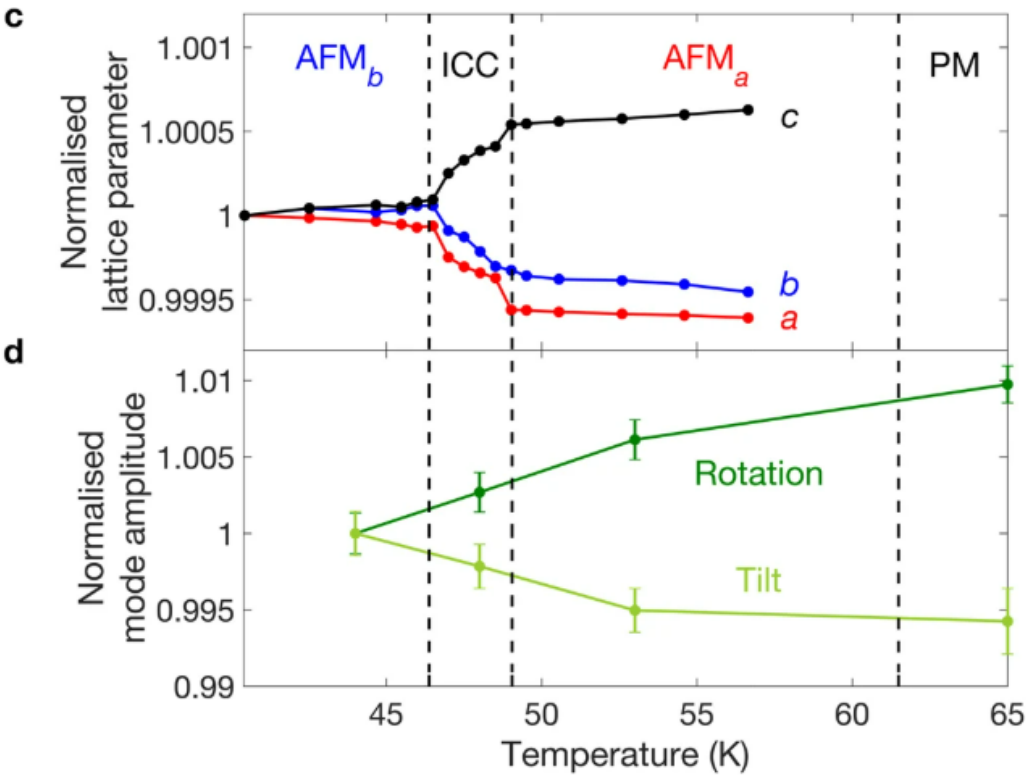

Fig 1: Temperature dependence of the octahedral rotation and tilt amplitudes determined from a symmetry analysis of single-crystal neutron diffraction data, normalised to the values at 44 K. Errors are standard deviations.

The results have been published in Nat. Communications : https://doi.org/10.1038/s41467-023-41714-8