

# Investigation of the stability range of the skyrmion phase in doped $\text{Cu}_2\text{OSeO}_3$

Monday, 2 December 2019 12:05 (15 minutes)

A skyrmion is a topological stable particle-like object comparable to spin vortex at the nanometre scale. It consists of an about 50 nm large spin rotation which order in a 2 dimensional, typically hexagonal superstructure perpendicular to an applied external magnetic field. Its dynamics has links to flux line vortices as in high temperature superconductors.  $\text{Cu}_2\text{OSeO}_3$  is a unique case of a multiferroic materials where the skyrmion dynamics could be controlled through the application of an external electric field. The direct control of the skyrmion dynamics through a non-dissipative method would offer technological benefits and unique possibilities for testing fundamental theories also related to the Higgs Boson whose theoretical description has similarities to skyrmions. Important for technological applications would be a stability range of the skyrmion phase up to room temperature. While room temperature skyrmion materials exist,  $\text{Cu}_2\text{OSeO}_3$  orders magnetically below 60 K. Our combined small angle neutron scattering, SQUID magnetization measurements, and electron microscopy investigations did provide direct evidence that the stability range of the skyrmion phase can be extended in Te-doped  $\text{Cu}_2\text{OSeO}_3$ . This did provide valuable information on the formation mechanism of the skyrmions and their scaling behavior.

## Level of Expertise

Expert

Do you wish to take part in the poster slam

## Travel Funding

No

## Speakers Gender

Male

Primary author: ULRICH, Clemens (The University of New South Wales)

Co-authors: SAUCEDA FLORES, Jorge Arturo (University of New South Wales); ROV, Rosanna (University of Auckland); Mr VATS, Gaurav (The University of New South Wales); Mr HAN, M.-G. (Condensed Matter Physics and Materials Sciences Department, Brookhaven National Laboratory); KHARKOV, Yaroslav (UNSW); SUSHKOV, Oleg (University of New South Wales); Dr ZHU, Y. (Condensed Matter Physics and Materials Sciences Department, Brookhaven National Laboratory); Prof. SEIDEL, Jan (The University of New South Wales); SOEHNEL, Tilo (The University of Auckland)

Presenter: ULRICH, Clemens (The University of New South Wales)

Session Classification: Session 1

Track Classification: Advanced materials