



Contribution ID: 209

Type: Poster

## magnetic structure of Mn<sub>2</sub>GaC thin film by neutron diffraction

*Monday, 20 March 2023 16:00 (2 hours)*

Mn<sub>2</sub>GaC (space group P6<sub>3</sub>/mmc) is a laminated material consisting of Mn<sub>2</sub>C layers interleaved with Ga layers. The competition between antiferromagnetic and ferromagnetic interactions within the Mn<sub>2</sub>C planes gives rise to complex magnetic behaviors. It orders magnetically below T<sub>N</sub> = 507 K and shows another magnetic transition at T<sub>C</sub> = 220 K. We employed neutron diffraction to study the nature of the magnetic order with single crystal neutron diffractometer D10 at ILL and WISH at ISIS. We identified two sets of reflections that are consistent with two propagation vectors, q<sub>1</sub> = (0, 0, 2/3) and q<sub>2</sub> = (0, 0, 0.54) at both 300 K and 1.5 K, where q<sub>1</sub> is predominant at 300 K while q<sub>2</sub> is stronger at 1.5 K. By fitting the integrated intensity of the magnetic reflections and by considering the presence and absence of certain peaks, we proposed a transverse spiral structure along c axis.

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**Session Classification:** Poster Session MONDAY

**Track Classification:** Magnetism, Superconductivity, Topological Systems, Magnetic Thin Films and other electronic phenomena