



**S N BOSE NATIONAL CENTRE  
FOR BASIC SCIENCES**

*Block JD, Sector III, Salt Lake, Kolkata 700 106*

**DEPARTMENTAL SEMINAR**  
**Condensed Matter Physics and Material Sciences**

**06<sup>th</sup> October'2021**

**4.00PM**

**ONLINE**

**SPEAKER**

**Dr. Sanjay Singh**  
**Assistant Professor, School of Materials Science and Technology,**  
**Indian Institute of Technology (BHU)**

**TITLE OF THE TALK**

**"Discovery of Bain Distorted Premartensite Phase in Pt Substituted Ni<sub>2</sub>MnGa  
Magnetic Shape Memory Heusler Alloys"**

**ABSTRACT**

Magnetic shape memory Heusler alloys (MSMHAs) have generated tremendous interest in the recent past due to their large magnetic field induced strain (MFIS) in the low-temperature martensite phase. In MSMHAs the stoichiometric Ni<sub>2</sub>MnGa has been investigated intensively due to its large (10%) MFIS. Ni<sub>2</sub>MnGa exhibits paramagnetic to ferromagnetic transition at temperatures  $T_c \sim 373$  K and martensite transition at temperature  $T_M \sim 210$  K, respectively. The martensitic transition in Ni<sub>2</sub>MnGa is preceded by a precursor (premartensite) phase transition around  $T_{PM} \sim 260$  K. The large MFIS of Ni<sub>2</sub>MnGa is also closely linked with the incommensurate modulated structure of the martensite phase. As the modulated phase of Ni<sub>2</sub>MnGa appears through a modulated premartensite phase and not directly from the high temperature austenite phase, understanding the premartensite phase and its effect on the low temperature martensite phase transition has been a hot topic of research in recent years. We present here direct evidence for the robust Bain distortion of the premartensite phase in Ni<sub>2</sub>MnGa MSMHA substituted with 10% Pt through a high-resolution synchrotron x-ray powder diffraction study. Our results clearly demonstrate that the premartensite phase should not be considered as a precursor state with the preserved symmetry of the cubic austenite phase.

**HOST FACULTY**

**Dr. Manoranjan Kumar**

**ASSOCIATE PROFESSOR, CONDENSED MATTER PHYSICS AND MATERIAL SCIENCES**

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