Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Frequency dependent susceptibility study for a ferromagnetic shape memory alloy[1] PRATIP MUKHOPADHYAY, B. RAJINI KANTH, SANDEEP AGARWAL, LCMP, S.N.Bose National Centre for the Basic Sciences — Ferromagnetic shape memory alloys (FSMA) display interesting interplay between thermal, structural and magnetic energies – manifested by different transformations occurring in the system as a function of temperature. These changes are generally measured by XRD, resistivity, DSC and magnetization studies. However, these are basically static measurements, showing no frequency dependence, i.e. the time evaluation in the systems. However, the major structural change that occurs in these alloys is the martensitic transformation, occurring in only milli-second time scale. Thus frequency dependent a.c. susceptibility measurements would be a natural choice to look into the time domain picture of the processes occurring in such a system. We report here such a measurement first time on a CoNiAl based FSMA system that was characterized by XRD, SEM, resistivity and magnetization measurements. In the susceptibility measurements done under 100Oe, we varied the temperature from 400K to 80K and back and frequencies from 66 to 5000 Hz – trying to match the slow dynamics in the system. The measurements indicated that there is a good amount of frequency dependence of the susceptibility, indicating that there are magnetic relaxations going on in the system in different time scales. We analyzed the results with Debye relaxation model.

[1]One of the authors, B.R.K., would like to thank DST project grant SR/S2/CMP-24/2006

Pratip Mukhopadhyay
LCMP, S.N.Bose National Centre for the Basic Sciences

Date submitted: 08 Dec 2009 Electronic form version 1.4