A simple result with deep implication in the field of spin-based electronics materials has recently been demonstrated by a group of researchers at IIT Indore. Here, the correlation between the magnetic ordering and local structural disorder in the unusual magnetic semiconductor, $CdCr_2Se_4$, has been investigated. These results are initial steps towards exploring the domain of spintronics and half-metallicity in Spinel Chalogenides.

$CdCr_2Se_4$ orders magnetically below T_C ~130K. The magnetic ordering is believed to result from strong competition between the direct Cr–Cr spin couplings and the Cr–Se–Cr exchange interactions. Partial substitution of Cd^{2+} by small percentage of non-magnetic In^{3+}, Sb^{3+}, or Sn^{4+} brings about local lattice distortion and changes in the electronic charge re-distribution that subtly affects the Cr–Cr and Cr–Se–Cr interactions. However, distinguishing the two types of effects on magnetic order is tricky as substitution of Cd-ions is seen to give rise to secondary phases and changes in crystal symmetry.

Dr. Preeti Bhobe's group from the Dept. of Physics realized that one way to spot these subtle features is to examine the local crystal structure using X-ray Absorption Fine structure Spectroscopy (XAFS) *vis-a-vis* magnetic properties using SQUID-based magnetometer in $Cd_{1-x}M_xCr_2Se_4$ (M = Sb, Sn, In). The preliminary results of this study have been published in *Journal of Magnetism and Magnetic Materials, Vol: 394, 200-206 (2015).*