



# INSTITUTE SEMINAR

Friday, 17 July 2015

4:00 p.m.

Boson

**Speaker:**

**Prof. Venimadhav Adyam**

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**Title:**

**Magnetic phenomena, multiferroicity and the effect of antisite disorder in  $R_2CoMnO_6$  (R-rare earth) double perovskites**

**Abstract:**

Coexistence of long range spin and dipolar ordering has been studied with a greater interest to obtain linear magnetoelectric effect for intelligent devices and sensors. In this context, double perovskites  $A_2B\phi B^2O_6$  provide an unique alternate opportunity to promote multiferroic behaviour with high magnetic ordering temperature and insulating behavior. Particular interest is on those with the strong ME coupling having complex spin structures that break spatial inversion symmetry to generate an electric polarization.

While competing interactions and topological frustration destroy the long range ordering and drives the system into non equilibrium state with glassy behaviour. In double perovskite multiferroics, B-site ordering is crucial and strongly influences various physical properties. Having different ferroic order parameters, MF are very attractive for random access memory applications. There has been a great interest in electrical control of exchange bias (EB) devices using MF materials where the ME media can be engineered with a FM layer to cause a shift in M (H) loop just with the electric field. On the other hand, MF materials can facilitate unique application such as energy efficient multiple caloric cooling effects and open the door for electric and magnetic field based solid-state refrigeration technology.

An over view on multiferroic will be given with an emphasis on recent progress in double perovskites oxides. Our investigations on MF nature, complex magnetic behaviour and exchange bias effects in  $A_2CoMnO_6$  will be presented and demonstrate the multicaloric effect in double perovskite multiferroics. Finally, discuss on some unusual observations like magnetic field driven spin glass state and anti-site disorder driven spontaneous exchange bias effect in these systems.

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