

Abstract Submitted  
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**Complimentary Ferromagnetic Mechanisms in Mn doped ZnO Thin films deposited using Pulsed Laser Ablation**<sup>1</sup> DEVAJYOTI MUKHERJEE, TARA DHAKAL, HARIHARAN SRIKANTH, PRITISH MUKHERJEE, SARATH WITANACHCHI, University of South Florida — We show evidence through experiments and analysis that the ferromagnetism (FM) in 2% Mn doped ZnO (ZMO) thin films is a combination of two complementary mechanisms - the bound magnetic polaron (BMP) percolation at low temperatures and the Ruderman-Kittel-Kasuya-Yosida (RKKY) exchange interaction at higher temperatures. Pulsed laser deposition was used to grow ZMO thin films on c-cut sapphire substrates. Films were deposited at various temperatures and background oxygen pressures to study the effect of growth parameters on the FM. While no impurity-phase contributions were detected, a strong correlation between effective carrier densities and FM was established. FM in amorphous films with high defect densities were described by the BMP model whereas that in highly conducting films was consistent with the RKKY mechanism. Detailed characterization of the structural, electrical and magnetic properties of the as-deposited ZMO films will be presented.

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