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Anisotropy Lock-in model for the magnetism of (Zn,Co)O STEFANO SANVITO, Trinity College Dublin — An explanation for the magnetism of diluted magnetic oxides remains elusive to the present day. Super-exchange is short ranged and leads to anti-ferromagnetic interaction, while double exchange needs unrealistically large charge densities to give room temperature ferromagnetism. Moreover there is growing experimental evidence that free-charges alone are not sufficient for the magnetism, which in turn is driven by intrinsic defects. Supported by density functional theory and Monte Carlo simulations we will present a coherent and complete picture of the magnetism in (Zn,Co)O. We will argue that Co clustering is essential for the magnetism and that a wurtzite CoO phase, difficult to detect by X-ray, is responsible for most of the magnetic signal. In this picture, strongly compensated CoO clusters with random anisotropy fields mimic the hysteresis loops often observed experimentally and attributed to long-range ferromagnetic interaction.

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