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Magnetic and Specific Heat Studies of Multiferroic Hexagonal $DyMnO_3$ YING ZOU, SHISHIR RAY, SOMADITYA SEN, MARK WILLIAMSEN, PRASENJIT GUPTASARMA[1], University of Wisconsin-Milwaukee, USA — Rare earth (R) manganites ($RMnO_3$) are well known to exhibit novel magnetic and magnetoelectric multiferroic properties. Under normal conditions, R=La through Dy yields orthorhombic lattice symmetry, whereas R=Ho through Lu yields hexagonal lattices. We confirm however that $DyMnO_3$ single crystals, when grown in Argon from a floating zone, have a hexagonal lattice structure [1]. We further report new features in the H-T phase diagram in the range 0.3-300K and 0-9 Tesla. Specific heat measurements show two transitions at 4K and 63K in the absence of a magnetic field. dc-Magnetization shows a cusp at 4K, which we attribute to a Dy3+ spin ordering. Time-dependent relaxation and frequency dependent shifting in ac susceptibility reveals a spin-glass behavior at this temperature, possibly suggesting an incommensurate Dy magnetic structure. An interesting bifurcation occurs for the high temperature transition (T=63K) in ac susceptibility with increase in frequency of the ac field.
[1] V.Y.Ivanov et al, Phys.Solid State, 48(2006)1726

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