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Low Temperature Phase Transitions in Single Crystal Magnetoelectric $GdMnO_3$ MARK WILLIAMSEN, SHISHIR RAY, SOMADITYA SEN, YING ZOU, PRASENJIT GUPTASARMA[1], University of Wisconsin-Milwaukee — $GdMnO_3$ is proposed to have a magnetic phase transition from paramagnet to incommensurate antiferromagnet at 43K, further ordering to canted antiferromagnetism around 23K, followed by Gd magnetic ordering at 6.5K[1]. We present further studies of a large single crystal of orthorhombic $GdMnO_3$ grown by us from a floating zone, revealing additional features at lower temperature. Dielectric spectroscopy measurements confirm these new features. We also report dc-magnetization, frequency dependent ac-magnetization 2-300K, and specific heat 0.4-300K in a variable magnetic field 0-9T, and propose additional features in the magnetoelectric phase diagram. [1]T. Kimura,Phys.Rev.B 71,224425(2005)

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