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Origin of the Non-Linear Pressure Effects in Perovskite Manganites¹ ZHIQIANG CHEN, TREVOR TYSON, KEN AHN, New Jersey Institute of Technology, ZHONG ZHONG, Brookhaven National Laboratory, JINZHU HU, University of Chicago — High-pressure resistivity and x-ray diffraction measurements were conducted on $\text{La}_{0.85}\text{MnO}_{3-\delta}$ to ~ 6 GPa and ~ 7 GPa, respectively. At low pressures the metal-insulator transition temperature (T_{MI}) increases linearly up to a critical pressure, $P^* \sim 3.4$ GPa, followed by reduction of T_{MI} at higher pressure. Analysis of the bond distances and bond angles reveal that a bandwidth increase drives the increase of T_{MI} below P^* . The reduction of T_{MI} at higher pressures is found to result from Jahn-Teller distortions of the MnO_6 octahedra. The role of anharmonic interatomic potentials is discussed.

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Zhiqiang Chen
New Jersey Institute of Technology

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