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X-ray absorption spectroscopy at the Mn K-edge in mutliferroic rare earth manganate thin films

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Orthorhombic rare earth manganates are materials showing a strongly coupled ferroelectric and magnetic order parameter at low temperatures. To better understand the influence of the MnO6 octahedron distortion on the magnetic ordering, the electronic structure of Mn in TbMnO3 and LuMnO3 thin films grown by pulsed laser deposition was investigated using XAS at the Mn K edge. XANES spectral changes are observed for the o-TbMnO3 films grown on different substrates, indicating the influence of film strain on the Mn-O bonding. The linear polarized XANES spectrum of an o-LuMnO3 film shows a strong polarization dependency of the white line position indicating the strong anisotropy of the x-ray absorption in the MnO6 octahedron. The influence of the rare earth element is also observed by comparing the o-LuMnO3 and o-TbMnO3 spectra where the white line of o-LuMnO3 shifts toward higher energy.

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Multiple Order Parameter Systems

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