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Thickness-dependent structure variation and novel electronic properties of $La_{2/3}Sr_{1/3}MnO_3$ film on $SrTiO_3$ (001) substrate[1] LINA CHEN, ZHEN WANG, JISUN KIM, GAOMIN WANG, HANGWEN GUO, MOHAMMAD SAGHAYEZHIANE, WARD PLUMMER, JIANDI ZHANG, Louisiana State University, JING TAO, YIMEI ZHU, Brookhaven National Laboratory — In principle, $La_{2/3}Sr_{1/3}MnO3$ (LSMO) is a half metal, which exhibits colossal magnetoresistance. However, it has been observed that the transport properties of LSMO thin films depends on their thickness. By combining *in-situ* scanning tunneling spectroscopy (STS), X-ray photoelectron spectroscopy, and low energy electron diffraction, as well as *ex-situ* scanning transmission electron microscopy, we have studied the structure-property relationship of LSMO on $SrTiO_3$(001) as a function of film thickness and temperature. Studying the electronic properties by STS, we found that LSMO films have the novel zero current bias shifts at low temperature, further enhanced by photons, which can be related to the charging of dielectric layer near the interface and polar surface effect. To figure out it, STS thickness and temperature dependence were systematically studied. Furthermore, film thickness-dependent structure and stoichiometry variation were determined, and their effect to the zero current bias shifts will be discussed.

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Lina Chen
Louisiana State Univ

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