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**Effect of the substrate on the orbital phase transition in a manganite thin film under magnetic field** Y. WAKABAYASHI, Osaka Univ., H. SAGAYAMA, T. ARIMA, Tohoku Univ., Y. NAKAMURA, Y. OGIMOTO, Tokyo Univ., K. MIYANO, Tokyo Univ., CREST, H. SAWA, Nagoya Univ. — Thin films of strongly correlated materials are studied intensively because of their potential of device application. Those materials in bulk form show various fascinating properties such as metal-insulator transition. However, clear phase transitions are often suppressed under the strain from the substrates. We have studied $Nd_{0.5}Sr_{0.5}MnO_3$ thin film on $SrTiO_3$ (011) substrate, which is a unique film that has clear orbital-ordering (OO) transition, by x-ray scattering under magnetic field up to 8T. As reported earlier [1], this system show three phase transitions, paramagnetic (PM), ferromagnetic (F), A-type OO (A) to CE-type OO (CE) with cooling in zero field, and at F-A transition temperature (170K), the symmetry lowers and twin occurs. The phase sequence was changed to PM, F to CE above 4T, and above this field, considerable amount of the FM phase remains down to 10K. This field induced phase separation is attributable to the martensitic accommodation strain at the domain boundary. [1]Y.W. et al., Phys. Rev. Lett. **96** 017202 (2006), J.Phys.Soc.Jpn. **77**, 014712 (2008).

Yusuke Wakabayashi
Osaka Univ.

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