Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Evolution of structural distortion in BiFeO3 thin films probed by second-harmonic generation KUIJUAN JIN, JIESU WANG, JUNXING GU, Institute of Physics, Chinese Academy of Sciences , L03 GROUP IN INSTITUTE OF PHYSICS, CHINESE ACADEMY OF SCIENCES TEAM — BiFeO3 thin films have drawn much attention due to its potential applications for novel magnetoelectric devices and fundamental physics in magnetoelectric coupling. However, the structural evolution of BiFeO3 films with thickness remains controversial. Here we use an optical second-harmonic generation technique to explore the phase-related symmetry evolution of BiFeO3 thin films with the variation of thickness. The crystalline structures for 60 and 180-nm-thick BiFeO3 thin films were characterized by high-resolution X-ray diffractometry reciprocal space mapping and the local piezoelectric response for 60-nm-thick BiFeO3 thin films was characterized by piezoresponse force microscopy. The present results show that the symmetry of BiFeO3 thin films with a thickness below 60 nm belongs to the point group 4mm. We conclude that the disappearance of fourfold rotational symmetry in SHG s-out pattern implies for the appearance of R-phase. The fact that the thinner the film is, the closer to 1 the tensor element ratio $\chi 31/\chi 15$ tends, indicates an increase of symmetry with the decrease of thickness for BiFeO3 thin films. email: kjjin@iphy.ac.cn

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Date submitted: 28 Oct 2016 Electronic form version 1.4