Abstract Submitted
for the 4CF17 Meeting of
The American Physical Society

Effects of Nb doping on structural and electrical properties on PZT thin films[1] MOHAMMAD ABDULLAH-AL-MAMUN, RICHARD MBATANG, New Mexico State University, EDWIN FOHTUNG, New Mexico State University; Los Alamos National Laboratory — Lead Zirconate Titanate ($Pb[Zr_xT_{1-x}]O_3$), known as PZT, is a piezoelectric material, widely used in memory applications, sensors and actuators. A major challenge for PZT is the accurate determination of its structural properties, which are ultimately responsible for improved functionality. We studied the structural properties, such as lattice strain, ferroelectric displacements and piezoelectric hysteresis, of PZT and Nb-doped PZT ($Pb[Nb_y(Zr_{1-x}Ti_x)_{1-y}]O_3$), known as PNZT. We used high-resolution X-ray diffraction and Bragg coherent diffraction. Under an external electric field, PZT and PNZT thin films show significantly different ferroelectric hysteresis behavior of polarizations. We tentatively attribute these differences to the role of Nb defects in PZT and its effects on the nature of the ferroelectric domains and domain walls.

[1]Support comes from DOD-AFOSR under Award No. FA9550-14-1-0363 and Los Alamos National Laboratory under subcontract No. 257827 funded as the LANSCE Professorship.

Mohammad Abdullah-Al-Mamun
New Mexico State University

Date submitted: 21 Sep 2017 Electronic form version 1.4