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Lattice rotation vortex observed between polar nanoregions in relaxor-ferroelectric (1-x)Pb($Zn_{1/3}Nb_{2/3}$)O_3-x$PbTiO_3$ single crystal[1] YU-TSUN SHAO, JIAN-MIN ZUO, Univ of Illinois - Urbana — Domain walls (DWs) play a critical role in determining the polarization switching behavior in relaxor-based ferroelectric crystals. The domains in relaxor-ferroelectric crystals consist of polar nanoregions (PNRs) and their interface is poorly understood. Here, we report an energy-filtered (EF-) scanning convergent beam electron diffraction (SCBED) study for the identification of PNRs and determination of their interface. With the aid of electro dynamical diffraction simulation, nanometer-sized PNRs having monoclinic *Pm* (M_C) symmetry in single crystal PZN- 8%PT were identified. Lattice rotation vortices having an average radius of ˜7 nm at the 50DWs were revealed by maps of crystal orientations, domain configurations, symmetry breaking. Such measurements suggest the merging of 2D and 1D topological defects, with implications for domain-switching mechanisms in relaxor ferroelectric crystals. The interplay between polarization, charge, and strain degrees of freedom suggests a complex landscape of topological defects in ferroelectrics that may be explored for a new form of nanoscale ferroelectric devices.

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