

Poster-1-22

Surface symmetry characterization of SrTiO₃(111) via optical second harmonic generationChangjae Roh and Andrea Caviglia*Department of Quantum Matter Physics, University of Geneva*

In this presentation, we report experimental findings regarding the structural symmetry evolution of SrTiO₃(111) single crystal using optical second harmonic generation (SHG). We monitor finite and clear anisotropy of azimuth-angle dependent SHG response that is allowed by the structural discontinuity at surface. In particular, we observe three different types of SHG responses depending on the temperature. Above 105 K, in triangular lattice of cubic phase along (111) direction, azimuth-angle dependent SHG pattern displays six-fold anisotropy reflecting the trigonal symmetry at the surface. Below 105 K, SHG pattern manifests two-fold symmetry with six lobes, which reflects symmetry lowering. Below 40 K, SHG response acquires a different two-fold pattern with four lobes associated with the quantum paraelectric phase. We analyze the monitored SHG patterns by considering electric dipole contributions and discuss surface symmetry evolutions resulting from the two structural phase transitions: triclinic-monoclinic phase transition and monoclinic-quantum paraelectric phase transition at 105 K and 40 K, respectively.