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Nonlinear optical study of surface electrons on $Ba(Fe_{1-x}Co_x)_2As_2$
CHANGMIN LEE, FAHAD MAHMOOD, JAMES MCIVER, MIT, G.F. CHEN, J.L. LUO, N.L. WANG, Institute of Physics, Chinese Academy of Sciences, NUH GEDIK, MIT — We report second harmonic generation (SHG) measurements on single crystals of $Ba(Fe_{1-x}Co_x)_2As_2$. SHG from $Ba(Fe_{1-x}Co_x)_2As_2$ is dominated by surface contributions due to the broken inversion symmetry at the surface. By varying the polarization of incident ultrafast laser pulses, we demonstrate that SHG reveals the tetragonal crystal structure of $Ba(Fe_{1-x}Co_x)_2As_2$ at ambient conditions. We will discuss prospects of using SHG as a probe of the surface electrons, the in-plane anisotropy, and the dichotomy between surface and bulk superconductivity in iron-based superconductors.

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