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Optical investigation of $Ba(Fe_{1-x}Co_x)_2As_2$ detwinned by tunable uniaxial applied pressure CHIARA MIRRI, ADAM DUSZA, SANDRA BASTELBERGER, ANDREA LUCARELLI, Solid State Physics Laboratory, ETH Zurich, CH-8093 Zurich, Switzerland, HSUEH-HUI KUO, JIUN-HAW CHU, IAN FISCHER, Geballe Laboratory for Advanced Materials and Department of Applied Physics, Stanford University, Stanford, California 94305-4045, USA, LEONARDO DEGIORGI, Solid State Physics Laboratory, ETH Zurich, CH-8093 Zurich, Switzerland — The iron-pnictide superconductors are excellent materials where one can study the competition between structural, magnetic and superconducting phases. In the parent compound (i.e. x = 0%) and in the so called underdoped regime (x<6%) an antiferromagnetic transition occurs at T_N with an almost coincident tetragonal-to-orthorhombic structural distortion at $T_s \geq T_N$. The in-plane anisotropy of the orthorombic phase was found to be masked by the formation of twin domains in these compounds, which can be detwinned by applying uniaxial pressure. Here we report on an optical investigation performed with electromagnetic radiation polarized along the a and b axes of $Ba(Fe_{1-x}Co_x)_2As_2$ single crystals , for x=0, 2.5% and 4.5%, detwinned by in-situ tunable uniaxial pressure applied across the stuctural and the magnetic transitions. We show in details the experimental setup, i. e. the pressure device used to detwin the samples, and the most remarkable results. In particular we focus on the evolution of the anisotropy in the reflectivity by applying and releasing pressure at different fixed temperatures.

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