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Chasing the nematic phase in detwinned $Ba(Fe_{1-x}Co_x)_2As_2$ with optical investigations C. MIRRI, S. BASTELBERGER, A. DUSZA, A. LUCARELLI, ETH Zurich, H.-H. KUO, J.-H. CHU, I.R. FISHER, Stanford University, L. DEGIORGI, ETH Zurich, ETH ZURICH TEAM, STANFORD UNIVERSITY COLLABORATION — A renewed interest in the study of symmetry-breaking competing states in complex interacting systems followed the discovery of a broken rotational symmetry, due to stripe or nematic order, in the pseudogap phase of the copper oxide superconductors. The most recent playground in which to address the competition between structural, magnetic and superconducting phases is provided by the iron-pnictide superconductors. In these systems, the non-superconducting parent compounds undergo an antiferromagnetic transition into a broken-symmetry ground state at T_N, which is always preceded by or coincident with a tetragonal-to-orthorhombic structural distortion at T_s. Here, we investigate the optical conductivity with light polarized along the in-plane orthorhombic a- and b-axis of $Ba(Fe_{1-x}Co_x)_2As_2$ for x=0, 2.5% and 4.5% (i.e., in the so-called underdoped regime) under *tunable* uniaxial pressure across their structural and magnetic transitions. We estimate the dichroism, which extends to high frequencies and temperatures. All together, our results on such single domain specimens reveal a nematic susceptibility as well as the electronic nature of the structural transition.

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