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Origin of Electronic Nematicity in the Iron Pnictide $NaFe_{1-x}Co_xAs$ Superconductor[1] VERNER THORSMOLLE, WEI-LU ZHANG, Rutgers, The State University of New Jersey, CHENGLIN ZHANG, SCOTT CARR, PENGCHENG DAI, Rice University, GIRSH BLUMBERG, Rutgers, The State University of New Jersey — Doped iron pnictides present a complex phase diagram with superconductivity in close proximity to antiferromagnetic and structural transitions (ST). In addition to these phases, an electronic nematic phase has been suggested to be associated with the tetragonal-to-orthorhombic transition at T_S. Electronic nematicity breaks C_4 rotational symmetry and is believed to be the driving force behind the ST. However, at present, the main interaction behind electronic nematicity and nematic fluctuations remain unexplained. Using electronic Raman spectroscopy we show nematic charge fluctuations in the XY symmetry channel to follow a Curie-Weiss-like temperature dependence extending over a $\sim$200 K range above T_S and in the entire phase diagram including the superconducting phase in $NaFe_{1-x}Co_xAs$ ($0 < x < 0.08$) single crystals. The nematicity is found to originate from orbital fluctuations, interconnected with local phonons, and are described in the frame of a classical Curie-Weiss law two-level system corresponding to the d_{xz} and d_{yz} Fe-orbitals.

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