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Static Nematic Electronic Structure in the "Parent" State of the Iron-Based Superconductor Ca(Fe$_{1-x}$Cox)$_2$As$_2$ MILAN P. ALLAN, TIEN-MING CHUANG, Cornell University, JINHO LEE, Brookhaven National Laboratory, YANG XIE, Cornell University, NI NI, SERGEY L. BUD'KO, Ames Laboratory, GREGORY S. BOEBINGER, National High Magnetic Field Laboratory, PAUL C. CANFIELD, Ames Laboratory, J.C. SEAMUS DAVIS, Cornell University — We use spectroscopic imaging STM to study the electronic structure of $CaFe_{1.94}Co_{0.06}As_2$ in the antiferromagnetic and orthorhombic 'parent' state from which the iron-based high temperature superconductivity emerges with increased carrier density. We find static unidirectional nanostructures self similar at ~ 8 a_{FeFe}, aligned along the crystalline a (AFM) axis. This introduces an unidirectionality (nematicity) much stronger than one could expect from the musicale lattice distortion; on a lengthscale different than the AFM lengthscale.

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