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Enhancement of the Magnetic Ordered Moment in Electron-doped BaFe_2As_2 under Uniaxial Pressure DAVID TAM, YU SONG, PENGCHENG DAI, Rice University — Many iron superconductors exhibit structural and magnetic phases that break the in-plane symmetry of the iron-pnictogen or iron-chalcogen layers. We developed a new apparatus to apply large and highly controllable in-plane uniaxial stress to these materials along the direction of the orthorhombic distortion at low temperature. Using several complimentary techniques, including DC electrical resistivity, neutron diffraction, and muon spin relaxation, we find that crystalline twinning in $\text{BaFe}_{2-x}\text{Ni}_x\text{As}_2$ and $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ is completely suppressed and the magnetic ordering temperature increases under modest uniaxial pressure, consistent with the idea that orthorhombicity favors the magnetic phase. Moreover, we find an enhancement of the magnetic ordered moment in the samples near the superconducting regime. We argue these results demonstrate the importance of quantum fluctuations for superconductivity, for which uniaxial stress is a novel probe.

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