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Divergent nematic susceptibility of optimally doped Fe-based superconductors JIUN-HAW CHU, HSUEH-HUI KUO, IAN FISHER, Stanford University — By performing differential elastoresistivity measurements on a wider range of iron based superconductors, including electron doped ($Ba(Fe_{1-x}Co_x)_2As_2$, $Ba(Fe_{1-x}Ni_x)_2As_2$), hole doped ($Ba_{1-x}K_xFe_2As_2$), isovalent substituted pnictides ($BaFe_2(As_{1-x}P_x)_2$) and chalcogenides ($FeTe_{1-x}Se_x$), we show that a divergent nematic susceptibility in the B_{2g} symmetry channel appears to be a generic feature of optimally doped compositions. For the specific case of optimally "doped" $BaFe_2(As_{1-x}P_x)_2$, the nematic susceptibility can be well fitted by a Curie-Weiss temperature dependence with critical temperature close to zero, consistent with expectations of quantum critical behavior in the absence of disorder. However for all the other optimal doped iron based superconductors, the nematic susceptibility exhibits a downward deviation from Curie-Weiss behavior, suggestive of an important role played by disorder.

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