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Nematic charge fluctuations and electron-phonon coupling in $EuFe_2As_2$ and $SrFe_2As_2$ WEI-LU ZHANG, Chinese Academy of Sci (CAS), Rutgers, the State University of New Jersey, VERNER THORSMOLLE, HSIANG-HSI KUNG, PHILIP LUBIK, ALEXANDER LEE, GIRSH BLUMBERG, Rutgers, the State University of New Jersey, PIERRE RICHARD, HONG DING, Chinese Academy of Sci (CAS), ATHENA S. SEFAT, Oak Ridge National Laboratory, JACK GILLETT, SUCHITRA SEBASTIAN, Cavendish Laboratory, Cambridge University — We study phononic and electronic Raman scattering in the 122 iron pnictide parent compounds $EuFe_2As_2$ and $SrFe_2As_2$. Using polarized Raman spectra we identify all four Raman active phonon modes through the temperature range of 5-300 K from *ab* plane and *ac* plane. Strong interference of the phonon and the electronic continuum is observed in the A_g channel below the tetragonal (D_{4h}) to orthorhombic (D_{2h}) (T-O) phase transition. Quasi-elastic Raman scattering induced by nematic fluctuations observed in the B_{2g} channel in a wide temperature range above the T-O transition. The temperature dependence of the static Raman susceptibility derived from the Raman response $\chi'(0) = \frac{1}{\pi} P \int_{-\infty}^{\infty} \frac{\chi''(\omega)}{\omega} d\omega$ follows a Curie-Weiss like law $A(T\text{-}T_0)^{-1}$, where T_0 is about 50K below the T-O transition temperature. WLZ acknowledges ICAM support (NSF-IMI grant DMR-0844115), GB, VT and HHK acknowledge support by NSF DMR-1104884 and by U.S. DOE, BES, Award DE-SC0005463, AS acknowledges the support by US DOE, BES, Materials Sciences and Engineering Division.

Wei-Lu Zhang
Chinese Academy of Sci (CAS), Rutgers, the State University of New Jersey

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