

Abstract Submitted
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Linear Response Theory for Shear Modulus C_{66} and Raman Quadrupole Susceptibility: Evidence for Orbital Fluctuations in Fe-Based Superconductors HIROSHI KONTANI, YOUICHI YAMAKAWA, SEIICHIRO ONARI, Nagoya University — Existence of strong nematic fluctuations in various Fe-based superconductors has been discussed as a central issue. To clarify the origin, we discuss both the softening of shear modulus C_{66} and the enhancement of the charge quadrupole susceptibility observed by Raman spectroscopy $\chi_{x^2-y^2}^{\text{Raman}}$. Due to the Aslamazov-Larkin vertex correction (AL-VC), strong orbital nematic fluctuations are induced by spin fluctuations. The strong development of $1/C_{66}$ is given by the summation of the Pauli and Van-Vleck orbital susceptibilities due to AL-VC, whereas moderate enhancement of $\chi_{x^2-y^2}^{\text{Raman}}$ is induced by the Van-Vleck term only. Therefore, a consistent explanation for the difference behavior between two measurements is achieved based on the orbital fluctuation theory.

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