

Abstract Submitted
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Collective excitations of dynamic Fermi surface deformations in $\text{BaFe}_2(\text{As}_{0.5}\text{P}_{0.5})_2$ SHANGFEI WU, Rutgers Univ, GIRSH BLUMBERG, HSIANG-HSI KUNG, ALEXANDER LEE, Rutgers University, WEILU ZHANG, DING HU, HUICAN MAO, PIERRE RICHARD, HONG DING, Institute of Physics, CAS, PENGCHENG DAI, Rice University — Recent transport studies of the overdoped $\text{BaFe}_2(\text{As}_{0.5}\text{P}_{0.5})_2$ superconductor reported a crossover from non-Fermi liquid (NFL) to Fermi liquid (FL) behavior at around 100 K¹. Here we elucidate the spectroscopic signatures in this crossover regimes using polarization resolved Raman spectroscopy. In the FL regime below 100 K, we detect long-lived collective quadrupole symmetry excitations at about 32 meV in the B_{1g} and B_{2g} channels. We assign them to Pomeranchuk oscillations related to dynamical Fermi surface (FS) deformations. The Pomeranchuk oscillations show a similarity for the B_{1g} and B_{2g} quadrupole channels, which we explain by the large As/P disorder. We explain that the small Fermi energy is an essential condition for Pomeranchuk oscillations to be underdamped at low temperature².

¹J. Analytis et al. Nat.Phys.10,194(2014)

²S.Wu et al. arXiv:1607.06575

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