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Signatures of the s+ superconducting gap in electronic Raman Scattering and optical conductivity of Fe-based superconductors ILYA EREMIN, MPI for Physics of Complex Systems, ANDREY V. CHUBUKOV, MAXIM M. KORSHUNOV — We analyze the consequences of the extended s-wave symmetry of the superconducting gap, proposed recently in Fe-based superconductors, for the electronic pair-breaking Raman scattering and optical conductivity. We calculate conductivity and Raman intensity for elastic scattering and find that an extended s-wave superconducting gap gives rise to several specific features in optical and Raman response functions. In particular, we find that, for the A1g symmetry of the incoming light, there will be a resonant collective mode in the Raman response function at an energy $\omega < 2\Delta$. The latter is as a hallmark of the s+ superconductivity. Furthermore, the Cooper-pair weakening due to strong inter-band impurity scattering shifts the 2Δ features towards higher energies in both Raman scattering and optical conductivity. We argue that these features are present in the experimental data for iron-based superconductors.

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