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# Fermi liquid behaviour in strongly correlated metals

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A reference point for research on a wider range of correlated behaviour is provided by the so-called Fermi-liquids, characterized by a relaxation rate $w^2+(pk_BT)^2$. The theoretical prediction for the relaxation rate appearing in the optical conductivity is $p$=2 when considering the experimentally most accessible range $w > k_BT$. A number of recent optical studies have addressed the issue of Fermi-liquid characteristics, reporting indeed $w^2$ and $T^2$ for the optical scattering rate of a number different materials. However, a perfect match to the prediction $p$=2 has not been observed. One possible scenario that has been proposed to explain this discrepancy is the presence of magnetic impurities. In a recent study we have investigated $Sr_2RuO_4$, a material which can be synthesized in very pure form, with well-established $T^2$ resistivity below 25K. Here we observe a perfect scaling collapse of $1/\tau$ as a function of $w^2+(p\pi k_BT)^2$ for with $w$ < 36 meV, and temperature below 40K, with $p$=2. We also observe features in the spectrum at higher energy, which are manifestly beyond the Fermi-liquid model. The sign and size of these features agree quantitatively with the notion of resilient quasiparticles predicted by dynamical mean field theoretical calculations for this compound.

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