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Structure of the hidden order gap in URu_2Si_2 revealed by optical spectroscopy

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Among the heavy fermion compounds URu2Si2 has attracted considerable study due to the second order phase transition it undergoes at 17.5 K for which the order parameter has yet to be identified. We present high quality infrared optical data tracking the onset and evolution of the gap in the conductivity associated with the transition. This allows the detailed evolution of the electronic behaviour to be studied in both the coherent scattering regime above the transition and the hidden order state below the transition, and the evolution of the electronic density of states to be studied. Measurements on both the ab-plane and the c-axis of the tetragonal crystal structure reveal pronounced anisotropies as well as different gap structure. Finally, preliminary results on dependence of the evolution of the gap structure with Re doping will be presented.

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