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Non-Fermi liquid behavior from dynamical effects of impurity scattering in correlated Fermi liquids VIDHYADHIRAJA NARSIMHA MURTHY SUDHINDRA, Jawaharlal Nehru Ctr Adv Sci, PRAMOD KUMAR, Institut für Theoretische Physik, Johann Wolfgang Goethe-Universität — The interplay of disorder and interactions is a subject of perennial interest. In this work, we have investigated the effect of disorder due to chemical substitution on the dynamics and transport properties of correlated Fermi liquids. A low frequency analysis in the concentrated and dilute limits shows that the dynamical local potentials arising through disorder averaging generate a linear (in frequency) term in the scattering rate. Such non-Fermi liquid behavior (nFL) is investigated in detail for Kondo hole substitution in heavy fermions within dynamical mean field theory. Analytical expressions in limiting cases and numerical solutions of the dynamical mean field theory equations reveal that the nFL term will show up significantly only in certain regimes, although it is present for any non-zero disorder concentration in principle. Remarkably, we find that the nFL behavior due to dynamical effects of impurity scattering has features that are distinct from those arising through Griffiths singularities or distribution of Kondo scales. Relevance of our findings to experiments on alloyed correlated systems is pointed out.

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