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Pairing correlations near a Kondo-destruction quantum critical point LILI DENG, KEVIN INGERSENT, Department of Physics, University of Florida, JEDEDIAH PIXLEY, QIMIAO SI, Department of Physics and Astronomy, Rice University — Motivated by the unconventional superconductivity observed in heavy-fermion metals, we investigate the pairing susceptibility near a continuous quantum phase transition of the Kondo-destruction type. We first solve two-impurity Bose-Fermi Anderson models with Ising and Heisenberg forms of the inter-impurity exchange interaction using continuous-time Monte-Carlo and numerical renormalization-group methods [1]. For each model, we determine its phase diagram and show a Kondo-destruction quantum critical point separating Kondo-screened and local-moment phases. For antiferromagnetic inter-impurity exchange interactions, singlet pairing is found to be enhanced in the vicinity of the quantum critical point. We then proceed to study the Anderson lattice model based on a cluster extended dynamical mean-field theory (C-EDMFT). We show how the results of the two-impurity models connect to those near the Kondo-destruction quantum critical point of the lattice case, and discuss the implications of our results for superconductivity in quantum-critical heavy fermions.

[1] J. H. Pixley, L. Deng, K. Ingersent, Q. Si, arXiv:1308.0839.

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