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Mechanisms of finite-temperature magnetism in the three-dimensional Hubbard model DANIEL HIRSCHMEIER, Institut fr Theoretische Physik, Universitt Hamburg,, HARTMUT HAFERMANN, Mathematical and Algorithmic Sciences Lab, France Research Center, Huawei Technologies Co, EMANUEL GULL, Department of Physics, University of Michigan, ALEXANDER I. LICHTENSTEIN, Institut fr Theoretische Physik, Universitt Hamburg,, ANDREY E. ANTIPOV, Department of Physics, University of Michigan — We examine the nature of the transition to the antiferromagnetically ordered state in the half-filled three-dimensional Hubbard model using the dual-fermion multiscale approach. Consistent with analytics, in the weak-coupling regime we find that spin-flip excitations across the Fermi surface are important, and that the strong coupling regime is described by Heisenberg physics. In the intermediate interaction, strong correlation regime we find aspects of both local and non-local correlations. We analyze the critical exponents of the transition in the strong coupling regime and find them to be consistent with Heisenberg physics down to an interaction of U/t=10.

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