Dual fermion approach for disordered interacting fermion systems SHUXIANG YANG, Louisiana State University, PATRICK HAASE, University of Goettingen, HANNA TERLETSKA, Louisiana State University, Brookhaven National Laboratory, ZIYANG MENG, JUANA MORENO, MARK JARRELL, Louisiana State University, THOMAS PRUSCHKE, University of Goettingen — Understanding the combined effect of electron-electron interaction and disorder is one of the crucial questions in condensed matter physics. There is an obvious need of theoretical tools which allow to treat both these effects on equal footing. To study the intricate interplay of these effects, we generalize our recently proposed dual fermion approach to include both electron-electron interaction and disorder. Since the constraint imposed on the dual-space Feynman diagrams in the disordered case does not apply to those generated due to interactions, it is essential to treat elastic scattering processes due to the disorder separately from the inelastic scattering processes due to the pure interaction and mixed contributions. I will discuss the resulting diagrammatic formalism and an algorithm for its implementation. The possible applications for the Anderson Falicov-Kimball and the Anderson-Hubbard models are also discussed.

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