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Momentum-selective metal-insulator transition in the two-dimensional Hubbard model: An 8-site dynamical cluster approximation study EMANUEL GULL, Department of Physics, Columbia University, 538 West 120th Street, New York, New York 10027, USA, PHILIPP WERNER, Theoretische Physik, ETH Zurich, 8093 Zürich, Switzerland, OLIVIER PARCOLLET, Institut de Physique Théorique, CEA, IPhT, CNRS, URA 2306, F-91191 Gif-sur-Yvette, France, ANDREW J. MILLIS, Department of Physics, Columbia University, 538 West 120th Street, New York, New York 10027, USA — The dynamical cluster approximation with eight momentum cells reveals that the paramagnetic phase of the Hubbard model exhibits a pseudogap at intermediate coupling strengths and doping. We show that within this approximation the pseudogap arises because the metal-insulator transition is multistage and momentum-sector specific with Fermi-liquid metal and fully gapped insulator phases separated by an intermediate phase, in which some regions of the Brillouin zone are gapped while others sustain gapless quasiparticles. For reasonable second-neighbor hopping the pseudogap occurs for hole but not electron doping. The doping dependence of the gap is determined and results are presented for spectra. Comparison to dynamical mean-field studies on smaller clusters is made.

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