Study of the anisotropic two-orbital Hubbard model using dynamical cluster approximation[1] HUNPYO LEE, YU-ZHONG ZHANG, HARALD O. JESCHKE, ROSER VALENTI, Institut fuer Theoretische Physik, Unversitaet Frankfurt, HARTMUT MONIEN, Bethe Center for Theoretical Physics, Universitaet Bonn —

We employ a combination of dynamical cluster approximation with a continuous-time quantum Monte Carlo impurity solver to investigate the properties of a two-orbital Hubbard model with two different band widths on the square lattice. As a function of cluster size N_c, we study the influence of short-range spatial fluctuations on the nature of the metal-insulator transition and on the occurence of an orbital-selective Mott transition (OSMT). We observe that for $N_c = 2$ the OSMT is absent, and instead, at low temperatures a band insulator state is observed for both orbitals. For $N_c = 4$, cooperation and competition between spatial fluctuations and orbitals of different bandwidths allow us to distinguish five different phases including an OSMT phase. Based on our results, we discuss the nature of the gap opening.

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Date submitted: 19 Nov 2009   Electronic form version 1.4