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Spatially inhomogeneous phase in the two-dimensional repulsive Hubbard model[1] CHIA-CHEN CHANG, SHIWEI ZHANG, Department of Physics, The College of William and Mary — Using recent advances in the constrained-path auxiliary-field quantum Monte Carlo method, we study the ground state of the two-dimensional, single-band Hubbard model at intermediate interactions ($2 \leq U/t \leq 8$). In the first part of this study [1], we have determined the equation of state and also calculated the spin-spin correlation functions in square lattices up to size 16×16. Shell effects are eliminated and finite-size effects are greatly reduced by boundary condition integration. It was shown that, upon doping, the system separates into a region with antiferromagnetic (AF) order and a hole-containing region without AF order. In the second part, we study rectangular supercells up to 8×64 to examine the nature of this inhomogeneous phase, in particular to probe phase separation versus stripes and spin-density waves of long wave lengths. [1] Chia-Chen Chang and Shiwei Zhang, Phys. Rev. B 78, 165101 (2008)

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