Antiferromagnetism and d-wave superconductivity in the one-band Hubbard model using V-CPT

A.-M.S. TREMBLAY, DAVID SÉNÉCHAL, PIERRE-LUC LAVERTU, MARC-ANDRÉ MAROIS, Université de Sherbrooke and RQMP — Using variational cluster perturbation theory (V-CPT) we study the competition between d-wave superconductivity and antiferromagnetism in the the $t-t'-t''-U$ Hubbard model. Large scale computer calculations reproduce the overall ground state phase diagram of the high-temperature superconductors as well as the one-particle excitation spectra for both hole- and electron-doping. We identify clear signatures of the Mott gap as well as of antiferromagnetism and of d-wave superconductivity that should be observable in photoemission experiments.

1Supported by NSERC, FQRNT, CRC, CIAR