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Superconductivity in the 2D Hubbard model SARMA KANCHARLA, Dept. de physique, Universite de Sherbrooke, Sherbrooke, Quebec J1K 2R1, Canada , MASSIMO CAPONE, INFM-SMC and Istituto dei Sistemi Complessi CNR, Via dei Taurini 19, I-00185, Rome, Italy, MARCELLO CIVELLI, Dept of Physics, Rutgers University, Piscataway NJ USA, ANDRE-MARIE TREMBLAY, DAVID SENECHAL, Dept. de physique, Universite de Sherbrooke, Sherbrooke, Quebec J1K 2R1, Canada , GABRIEL KOTLIAR, Department of Physics, Rutgers University, Piscataway NJ USA — The superconducting (SC) ground state in the hole- and electron-doped two dimensional Hubbard model is investigated by means of the Cellular Dynamical Mean Field Theory. It is found to extend over a range of doping broadly consistent with the cuprates. The order parameter assumes a dome shape and scales with the magnetic exchange coupling J for U comparable to the bandwidth. Suppression of the order parameter with frustration suggests the pairing is driven by antiferromagnetic (AF) correlations. Increasing proximity to the Mott insulator resulting in a decrease of available carriers outweighs the effect of increasing AF correlations on the underdoped side to suppress the order parameter in comparison to optimal doping. Whereas, on the overdoped side, adding carriers frustrates the AF correlations to suppress the SC order.

Sarma Kancharla
Dept. de physique, Universite de Sherbrooke, Sherbrooke, Quebec J1K 2R1, Canada

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