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Electron charge pairing and Nagaoka spin instabilities in nanoclusters ARMEN KOCHARIAN, Department of Physics and Astronomy, California State University, GAYANATH FERNANDO, KALUM PALANDAGE, Department of Physics, University of Connecticut, JIM DAVENPORT, Computational Science Center, Brookhaven National — The electron pairings and magnetism in various frustrated Hubbard clusters are studied exactly with emphasis on under doping, magnetic field and temperature. Small clusters provide insight into charge spin separation and thermal condensation of electron charge and spin degrees [1]. The spin saturated phase in so called Nagaoka state is found equivalent to ferromagnetic Mott-Hubbard like insulator with spin pairing gap, while non maximum spin ground state is of BCS-like metallic origin with equal charge pairing and spin gaps. The calculated phase diagrams resemble a number of spatially inhomogeneous coherent and incoherent paired phases seen in nanometer scale in high T_c cuprates, fullerene molecules, Co and Nb nanoparticles. [1] A. N. Kocharian, G. W. Fernando, K. Palandage, Tun Wang and J. W. Davenport, Phys. Rev. B**74**, 024511 (2006); Phys. Lett. A**364**, 57(2007).

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