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Electron charge and spin pairing (pseudo)gaps and Nagaoka instabilities in nanoclusters ARMEN KOCHARIAN, Department of Physics and Astronomy, California State University Los Angeles, GAYANATH FERNANDO, TUN WANG, KALUM PALANDAGE, Department of Physics, University of Connecticut, JIM DAVENPORT, Computational Science Center, Brookhaven National Laboratory — The electron pairings, phase separation and magnetism in various frustrated Hubbard clusters are studied exactly with emphasis on tetrahedron and octahedron under doping, magnetic field and temperature. Small clusters yield intriguing insight into charge spin separation and invoked thermal condensation of electron charge and spin in more than one bosonic mode. The spin saturated phase in so called Nagaoka state is found equivalent to ferromagnetic Mott-Hubbard like insulator with (negative) spin pairing gap, while non maximum spin ground state is of BCS-like metallic origin with equal charge (negative) and spin (positive) pairing gaps. The calculated phase diagrams resemble a number of inhomogeneous coherent and incoherent paired phases in high T_c cuprates, fullerene molecules, Co and Nb nanoparticles.

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