Unconventional Pairing in 2D lattice with an “Inherent Gap”
RENYUAN LIAO, KHANDKER QUADER, Department of Physics, Kent State University — We investigate superconducting pairing in 2D lattice with an “inherent gap”. In this calculation, we take this gap to be a constant, and thus similar to that in semiconductors. We consider different pairing symmetries, namely, s-wave, extended-s-wave, p-wave and d-wave. We calculate superconducting gap parameters, critical temperatures, chemical potential, etc in terms of interaction strength and filling factor. There is a sharp transition from the “inherent gapped state” to a superconducting state for half filling $f=1/2$, corresponding to the undoped case. For finite doping, the transition becomes a smooth crossover. We also explore other features, such as the effect of phase fluctuations and the resulting Kosterlitz-Thouless transition; tunneling density of states, etc.