

Phenomenology of Superconductivity: Raman spectroscopy

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ABSTRACT: Calculations of the electronic Raman response were done using the B_{1g} and B_{2g} polarizations for a superconducting system on a 2-D square lattice with s, dx_y and dx²-y² pairing symmetry choices for different doping values. The magnitude of the order parameter (superconducting gap), extracted from the corresponding Raman spectra, were plotted for all three pairing symmetries as a function of doping and a comparison was made with experimental electronic Raman scattering results of various cuprate superconductors. Preliminary observations show that the dx_y symmetry does not fit the symmetry of the pair state. In this work, we also examine the electronic band structure and fermi surface for a system of Bogoliubov quasiparticles in the ground state using BCS theory and many-body methods and use numerical integration in python to compute the density of states.

ALL ARE WELCOME!