Abstract Submitted
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Linear and quadratic temperature dependence of electronic specific heat for cuprates[1] P. SALAS[2], F.J. SEVILLA, M.A. SOLIS, Instituto de Fisica, UNAM — We model cuprate superconductors as an infinite layered lattice structure which contains a fluid of paired and unpaired fermions (electrons or holes). Paired fermions, which are the superconducting carriers, are considered as noninteracting zero spin bosons (cuasi-particles) with a linear dispersion relation, which coexist with the unpaired fermions in a series of almost two dimensional slabs stacked in their perpendicular direction. The inter-slab penetrable planes are simulated by a Dirac comb potential in the direction in which the slabs are stacked, while paired and unpaired electrons (or holes) are free to move parallel to the planes. Paired fermions condense at a BEC critical temperature exhibiting a jump in their specific heat, which are taken as the experimental values of the superconducting critical temperature and the specific heat jump of $YBaCuO_{7-x}$, to fix our model parameters: the plane impenetrability and the fraction of superconducting charge carrier. We straightforwardly obtain, near and under the superconducting temperature T_c, the linear ($\gamma_e T$) and the quadratic (αT^2) electronic specific heat terms, with γ_e and α in agreement with the latest experimental values reported.

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