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## M1Po2D-06 [49]: Superconducting state at a square lattice: a case of linear electron-phonon interaction

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In the framework of the Eliashberg formalism has, the tendency to create phonon –induced superconducting state at a square lattice was analyzed. We have shown unbalanced superconducting state can not be created. However, for unbalanced parameter value smaller than  $c = 0.42$  the electron –phonon interaction may induce non –classical superconducting state –the thermodynamic functions of this phase, the more deviate from the predictions of the BCS mean –field theory, the higher the value of the parameter is. In the system, we observed an anomalous increase in the effective mass of the electron along with the increase in the unbalanced parameter. This contributes to a drastic drop in critical temperature.

Our results suggest that the key to the phonon induction of a superconducting state on a square lattice is the existence of additional interaction (mechanism), not necessarily of pure electronic origin, which will force the appropriate degree of unbalancing of the system. Our results undermine all results obtained for the phonon-induced superconducting state on a square lattice obtained in the framework of the isotropic approximation.

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