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Effects of fluctuations and Coulomb interaction on the transition temperature of granular superconductors ANDREI LOPATIN, IGOR BELOBORODOV, Argonne National Laboratory, KONSTANTIN EFETOV, Ruhr-Universitat Bochum, VALERII VINOKUR, Argonne National Laboratory — We investigate the suppression of superconducting transition temperature in granular metallic systems due to (i) fluctuations of the order parameter (bosonic mechanism) and (ii) Coulomb repulsion (fermionic mechanism) assuming large tunneling conductance between the grains $g_T \gg 1$. We find the correction to the superconducting transition temperature for 3 d granular samples and films. We demonstrate that if the critical temperature $T_c > g_T\delta$, where δ is the mean level spacing in a single grain the bosonic mechanism is the dominant mechanism of the superconductivity suppression, while for critical temperatures $T_c < g_T\delta$ the suppression of superconductivity is due to the fermionic mechanism.

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