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Quantum Coulomb glasses and electron assisted hopping MARKUS MULLER, Harvard University, LEV IOFFE, Rutgers University — In Anderson insulators where the single particle localization length is much larger than the mean distance between electrons, Coulomb interactions drive the electrons into a strongly correlated quantum glass phase. In the limit of large localization length, the resulting quantum Coulomb glass can be studied analytically. The theory predicts many almost degenerate quantum states with a spectrum of gapless collective excitations in each of them. The latter can acts as a bath with which individual electrons can exchange energy. This is a crucial ingredient for activated transport, the collective modes of the quantum glass providing a natural mechanism for electron-assisted hopping conductance. In particular, for 2D systems we predict a weakly temperature dependent pre-exponential factor of order e^2/h for variable range hopping, as has been reported in many recent experiments.

Markus Muller
Harvard University

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