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Collective modes in quantum electron glasses and electron-assisted hopping[1] MARKUS MUELLER, Harvard University, LEV IOFFE, Rutgers University — We study electronic transport in Anderson insulators with strong Coulomb interactions in dimensions $d \geq 2$. Close to the metal insulator transition where the single particle localization length is much larger than interparticle-distance, the interactions lead to a strongly correlated quantum glass phase. Even though single particle excitations are localized and the system is insulating, there are collective electronic modes which remain delocalized down to parametrically small energies. These collective excitations serve as a continuous bath which can provide the activation energy for variable range hopping transport. This circumvents the energy conservation problem arising when only discrete particle-hole excitations are present. In contrast to the weak and material-dependent phonon-assisted hopping mechanism, the activation by an electronic bath leads to a nearly universal prefactor e^2/h of the Efros-Shklovskii conductance, as is observed in many recent experiments.

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