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Glass transition and the Coulomb gap in electron glasses MARKUS MUELLER, LEV IOFFE, Rutgers University, Piscataway, NJ — We establish the connection between the presence of a glass phase and the appearance of a Coulomb gap in disordered materials with strongly interacting electrons (amorphous semiconductors or granular metals, e.g.). We map the model to an effective single site problem, treating the correlations between electrons in a self-consistent manner. We find that in the case of strong disorder a continuous glass transition takes place whose Landau expansion is identical to that of the Sherrington-Kirkpatrick spin glass. We show that the marginal stability of the glass phase controls the physics of these systems: it results in slow dynamics and leads to the formation of the Efros-Shklovskii Coulomb gap.

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