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Putting the Electron-Glass to Work; a test for Many-Body Localization

We describe how some of the unique properties of Electron-Glasses may be used to gain information on the fundamental nature of the Anderson-localized phase. Our experiments suggest that while the effective electron-electron interaction is long range, the electronic energy-spectrum of the system remains discrete. Therefore, electron thermalization hinges on the existence of a continuous bath (presumably, phonons). Also, the effect of non-ohmic field is not tantamount to heating; contrary to common views the conductance measured under (non-equilibrium) steady-state conditions is not a reliable thermometer. The implications of these results to the long-standing mystery of the pre-exponential term of hopping conductivity will be discussed.