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"Bad Metal" Conductivity of Hard Core Bosons NETANEL LINDNER, California Institute of Technology, Technion - Israel Institute of Technology, ASSA AUERBACH, Technion - Israel Institute of Technology — Two dimensional hard core bosons suffer strong scattering in the high temperature resistive state at half filling. The dynamical conductivity is calculated using non perturbative tools such as continued fractions, series expansions and exact diagonalization. We find a large temperature range with linearly increasing resistivity and broad dynamical conductivity, signaling a breakdown of Boltzmann-Drude quasiparticle transport theory. At zero temperature, a high frequency peak in the dynamical conductivity appears above a "Higgs mass" gap, and corresponds to order parameter magnitude fluctuations. We discuss the apparent similarity between conductivity of hard core bosons and phenomenological characteristics of cuprates, including the universal scaling of Homes et. al. (Nature 430, 539 (2004)).

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