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Lattice aspect ratio effects on transport in two-dimensional quantum percolation BRIANNA DILLON, HISAO NAKANISHI, Purdue Univ — In a previous work [Dillon and Nakanishi, E.Phys.J.B, to be published (2014)], we calculated the transmission coefficient of the two-dimensional quantum percolation problem and concluded that there are three regimes, namely, exponentially localized, power-law localized, and delocalized. However, this remains a controversial problem and works by many others fall either in a group claiming that quantum percolation in 2D is always exponentially localized (as one-parameter scaling would suggest) or in one claiming that there is a transition to a less localized (perhaps power-law localized or delocalized) state. Among the many different types of calculations, it stood out that most works based on two-dimensional strips of highly anisotropic aspect ratios fall in the first group, whereas our previous calculations and most others in the second group were based on isotropic square geometry. In order to understand the deviations between our results and those based on strip geometry, we applied our direct calculation of the transmission coefficient to strips of a wide range of aspect ratios, and report on how aspect ratio influences transmission and localization length.

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