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Localization phase diagram of two-dimensional quantum percolation BRIANNA DILLON, HISAO NAKANISHI, Purdue Univ — We examine two dimensional quantum percolation on a square lattice with random dilution up to $q = 38\%$ and energy $0.001 \leq E \leq 1.6$ (in units of the hopping matrix element), using numerical calculations of the transmission coefficient for finite size systems of up to about 900x900. We extended previous work to determine the phase diagram in (E, q) space, confirming the existence of a localization-delocalization transition. The localized region splits into an exponentially localized and power-law localized regions for energies $E \geq 0.1$. We also examine the scaling behavior of the residual transmission coefficient in the delocalized region, the power law exponent in the power-law localized region, and the localization length in the exponentially localized region. Our results suggest that the residual transmission at the delocalized to power-law localized phase boundary may be discontinuous, and that the localization length is likely not to diverge with a power-law at the exponentially localized to power-law localized phase boundary.

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