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Two-dimensional quantum percolation on anisotropic lattices BRIANNA DILLON THOMAS[1], St Olaf Coll, HISAO NAKANISHI, Purdue University — In a previous work [Eur. Phys.J B **87**, 286 (2014)], we calculated the transmission coefficient of the 2D quantum percolation (QP) model and found exponentially localized, power-law localized, and delocalized regimes. However, the existence of a delocalized state remains controversial. We note that many works claiming only localization in 2D QP are based on highly anisotropic 2D strips, whereas our work is based on an isotropic geometry. To understand the difference in our results and the anisotropic strip results, we apply our direct calculation of the transmission coefficient to highly anisotropic strips of varying widths at three energies and a range of dilutions. For parameters overlapping those used in other works on highly anisotropic strips, our results are consistent with localization found in those works. However, for low dilutions we find the localization length does not converge as the strip width increases toward the isotropic limit. This indicates a delocalized state for small disorder that lies outside of the parameter space investigated by such previous studies. We additionally calculate the inverse participation ratio of the lattices and find that it too is consistent with a phase transition from delocalized to localized states at the same dilutions.

[1]Presented research was completed while affiliated with Purdue University.

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