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Anderson Localization in Disordered Systems with Competing Channels HONGYI XIE[1], Physics & Astronomy Department, Rice University, VLADIMIR E. KRAVTSOV COLLABORATION[2], MARKUS MÜLLER COLLABORATION[3] — In a variety of physical contexts, for example, exciton-polaritons and field-effect transistors based on bi- or trilayer graphene, the situation arises that two or more propagating channels with different transport properties are coupled together and modifying each other's properties. One could ask what happens to the localization properties when a less localized lattice is coupled to a more localized one? Will the less localized one dominate the localization of the system or the more localized? The qualitative answer to this question depends on the dimensionality of the system. Correspondingly, we exactly solved the Anderson models on a two-leg ladder and on a two-layer Bethe lattice. In one dimension, the localization lengths of two coupled chains are of the order of the localization length of the more localized chain under resonance conditions. On the Bethe lattices, the less disordered lattice is not affected much by the more disordered lattice in the presence of coupling. These trends are believed to be persistent in high dimensions.

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