

Dimensionality reduction in quantum channels

We investigate changes in the correlation function of time-dependent wave function due to a dimensionality reduction in geometrical construction of quantum channels. The correlation functions give signatures that point to dominant eigen energies in all dimensions when the channel evolves from a 2D finite well to approach a 1D long one. On the other hand, when we introduce an obstruction in the channel, we found that the signatures only point to the dominant eigen energies in the dimension along the width of the obstruction. Those correspond to the other dimension along the length of the channel have eigen energies mixed and their statistical properties need further investigation. This setup demonstrates quasi-bound states in quantum channels.

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