Quantum mechanics on graphs: why is it interesting?

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The concept of quantum graph was born twice, and since its rebirth in the 1980s it enjoyed a permanent attention. It comes from the fact that such models are not only useful to describe properties of nanostructures but they also provide a test field where many features of quantum mechanics can be examined, sometimes viewed in an unusual light. We review examples showing relations between spectral properties of such graphs and their geometry and topology. We also mention an alternative model of the so-called leaky graphs in which the quantum tunneling is taken into account.

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