

# On the meaning of quantum graph Hamiltonians: approximations by Schrödinger operators on manifolds

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It is a longstanding problem how to understand the coupling in vertices of a quantum graph using an approximation by a family of appropriate “fat graphs”. In particular, it is known that if the approximating operators are Laplacians, the squeezing limit yields only the free (or Kirchhoff) boundary conditions. In this talk we report a recent result coming from a common work with Olaf Post: it will be shown that adding families of suitably scaled potentials one can get spectrally nontrivial vertex couplings, including those with wave functions discontinuous at the vertices. I will also mention a fresh result with Taksu Cheon and Ondřej Turek which shows way how to solve the problem in full generality.