Resonances in quantum graphs

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In this talk I am going to discuss recent results on resonances exhibited by Schrödinger operators on metric graphs and their generalizations, obtained in collaboration with Brian Davies and Jiří Lipovský. We will examine how resonances appear in such systems, in particular, as a result of geometric perturbations [1], and prove that different resonance notions coincide in this case. Next we are going to discuss high-energy behaviour of the resonances and present conditions under which they exhibit a non-Weyl semiclassical behavior [2]; we will also show that a magnetic field may influence the effective size of the graph entering the asymptotics [3]. Finally, we will indicate how some of the results extend to generalized graphs with 'edges' of different dimensions and show that in this case too it may happen that the magnetic field removes all the 'true' resonances [4].

References

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[4] *P. Exner, J. Lipovský*: Resonances on hedgehog manifolds. Acta Polytechnica. (2013), to appear; `arXiv:1302.5269 [math-ph]`