Effective Hamiltonians in curved spatial waveguides

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Abstract

Motivated by recent controlled growth of ultralong single-wall carbon nanotubes, the singular limit of the Dirichlet Laplacian in (appropriate) curved tubes in space will be described as the tube cross-sections vanish. The limits are in the strong and norm resolvent sense. It will be argued that geometric characteristics of the tubes play an essential role in effective operators, and recent tube configurations and results will be presented. The final lecture will apply such ideas to discuss the controversial problem of the one-dimensional Coulomb potential.