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Zhiqin Lu and **Christopher Lin*** (clin@math.uci.edu), 103 Multipurpose Science & Technology Bldg, University of California Irvine, Irvine, CA 92697-3875. *The Discrete Spectrum of Generalized Quantum Tubes.*

We consider the problem of finding sufficient conditions for the existence of discrete spectra of the Dirichlet Laplacian on a tubular manifold about a complete manifold immersed in Euclidean space with arbitrary codimension. The problem is a generalization of the non-relativistic one-particle problem considered by Duclos, Exner, and Krejčířík. We define the tubular manifold, or quantum tube - as it has been termed, on the normal bundle of the immersion and its geometry is explicitly calculated. Then under suitable asymptotically vanishing curvature conditions and nonpositive total curvature conditions, we derive the existence of discrete spectra of the Laplacian acting on functions with Dirichlet boundary conditions. Furthermore, the sufficient nonpositive total curvature condition is shown to be the nonpositivity of the integral of certain intrinsic geometric-topological invariants on the immersed manifold. Thus our work goes in the direction of generalizing the phenomenon of localization of non-relativistic particles, and we do so by viewing the phenomenon as a consequence of conditions on intrinsic differential geometric quantities. (Received August 02, 2005)