Spectral theory on twisted connected sums

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Abstract

We describe a general method to study a large class of adapted elliptic PDEs in gluing problems where to asymptotically conical manifolds are glued along a neck of length 2T. In the limit where T goes to infinity, we describe the obstructions to constructing approximate solutions to such equations. As an application, we give estimates on the decay rate and the density of low eigenvalues of the Laplacian acting on differential forms on compact manifolds constructed by twisted connected sum. We also explain how this relates to the swampland distance conjectures in physics. Based on arXiv:2301.03513