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Convergence of spectral structures: a functional analytic theory and its applications to spectral geometry

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We present a functional analytic framework of some natural topologies on a given family of spectral structures on Hilbert spaces and study convergence of Riemannian manifolds and their spectral structure induced from the Laplacian. We also consider convergence of Alexandrov spaces, locally finite graphs, and metric spaces with Dirichlet forms. Our study covers convergence of noncompact (or