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*Metric Degeneration and Spectral Convergence.*

Manifolds with singularities arise naturally in several contexts including:

- extremal metrics in spectral geometry.
- limit spaces of families of metrics satisfying a curvature condition,
- string theory model spaces.

The spectral geometry on a smooth compact manifold determines local geometric invariants and global topological invariants which in some cases are related, for example by the classical Gauss Bonnet Formula and the more recent Cheeger-Müller (Bismut-Zhang) Theorem. This motivates the following questions:

- What is the spectral geometry of a manifold with singularities?
- If a family of smooth compact Riemannian manifolds converge to a singular space, what happens to the spectral geometry?
- Do manifolds with singularity have formulas relating local geometry to global topological invariants?

This talk is a brief survey of three different ways in which a family of smooth compact Riemannian manifolds converge to singular limit spaces and the spectral geometry convergence results obtained in these contexts. (Received September 19, 2007)