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Perelman's functionals on compact manifolds with conical singularities

We extend the theory of the Perelman's functionals on smooth compact manifolds to manifolds with isolated conical singularities. For the λ-functional, this is essentially an eigenvalue problem for a Schrodinger operator with singular potential. We obtain a certain asymptotic behavior of eigenfunctions near the singularities. This asymptotic behavior plays an important role for deriving the variation formulas of the λ-functional and other applications. Moreover, we show that the infimum of the W-functional over a suitable weighted Sobolev space on compact manifolds with isolated conical singularities is finite, and the minimizing function exists. We also obtain a certain asymptotic behavior for the minimizing function near the singularities. This is a joint work with Prof. Xianzhe Dai.