On Topological Obstructions of Compact Riemannian and Combinatorial Positively Ricci Curved Manifolds

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Abstract

To investigate the relationships between curvature and topology of a Riemannian manifold is a fundamental question in Riemannian geometry. The classical Myers' theorem shows that the fundamental group of a compact Riemannian manifold with positive Ricci curvature must be finite. It is interesting to investigate the problem that "*What can be said about the fundamental group of a compact positively Ricci curved manifold depending only on the dimension of the manifold, except that it is finite?*" In this talk, we will first give a new information on obstruction to these groups. Moreover, this investigation gives a partial answer to Gromov's conjecture about almost nonnegative Ricci curved manifolds.

On the other hand, Prof. Rubin Forman (in Rice Univ.) introduced a new notion, *combinatorial curvature*, of curvature for cell complexes. This notion is purely combinatorial since it depends only on the relationships between the cell and its neighbors. Interestingly, Myers' theorem has its analogue in this combinatorial setting. We will also give in this talk an obstruction to a compact combinatorial manifold with positively combinatorial curvature, and compare it with that in the Riemannian setting.