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Curvature and Fundamental Group

A central theme in Riemannian geometry is the study of the interplay between curvature and topology. Particularly relevant is the investigation of algebraic restrictions on the fundamental groups of manifolds satisfying different curvature bounds. Starting from Gromov's celebrated almost flat theorem for manifolds with bounded sectional curvature, and the Fukaya–Yamaguchi almost nilpotency theorem for spaces with lower sectional curvature bounds, it has become clear that nilpotent structures play a fundamental role in this context.

The aim of this course is to review these classical results and key examples, and then to focus on more recent developments involving Ricci curvature bounds, including progress related to the Milnor conjecture.