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Will Wylie* (wwylie@math.ucsb.edu), Department of Mathematics, University of California, Santa Barbara, CA 93106. *Far Homotopies and the Tangent Cone at Infinity.*

In 1968 Milnor conjectured that the fundamental group of a complete manifold with nonnegative Ricci curvature must be finitely generated. While there are many strong partial results supporting the conjecture there is still no complete proof or counterexample. Here we attempt to investigate additional properties of the fundamental group in cases where the fundamental group has already been shown to be finitely generated. In particular, we will show in certain cases that if we are given two homotopic loops in the fundamental group we can control the length of the homotopy between them based upon the lengths of the curves. We will also discuss the relationship between this geometric control on the fundamental group and special Gromov Hausdorff limits of the manifold called tangent cones at infinity. (Received February 22, 2005)