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Classification of cohomogeneity one manifolds in low dimensions.

A cohomogeneity one manifold is a manifold together with the action of a Lie group such that there is a codimension one orbit. Such manifolds are important in Riemannian geometry as examples of nonnegative curvature as well as in other areas of geometry. In this talk I will present the classification of compact simply connected cohomogeneity one manifolds in dimensions 5, 6 and 7 and discuss the implications for nonnegative curvature. (Received August 21, 2007)