

Positively curved cohomogeneity one manifolds

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Abstract

A Riemannian manifold is said to have cohomogeneity one if the action of the isometry has an orbit of codimension one. Recently Verdiani has shown that an orientable compact even dimensional positively curved manifold of cohomogeneity one is diffeomorphic to a rank 1 symmetric space.

In odd dimensions the corresponding the theorem is not valid, as besides the sphere there some homogeneous spaces and some biquotients in dimension 7 or 13 which have a positively curved cohomogeneity one 1 metric.

In joint work with Karsten Grove and Wolfgang Ziller, we show that a compact positively curved cohomogeneity one manifold is either diffeomorphic to one of the known positively curved biquotients or it is up to covering diffeomorphic to a 7-dimensional 3 Sasakian manifold corresponding to one of the 4-dimensional cohomogeneity one selfdual Einstein orbifolds that have been classified by Hitchin.