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EXOTIC SPHERES WITH POSITIVE RICCI CURVATURE

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Abstract

We show that a certain class of manifolds admit metrics of positive Ricci curvature. This class includes many exotic spheres, including all homotopy spheres which represent elements of bP_{2n}.

§0.

In this paper we investigate the Ricci curvature of a certain class of manifolds which includes many exotic spheres. In particular we will be concerned with constructing metrics of positive Ricci curvature. Our main result is as follows:

Theorem 2.1. *Homotopy spheres which bound parallelisable manifolds admit metrics of positive Ricci curvature.*

The diffeomorphism classes of homotopy spheres bounding parallelisable manifolds of dimension m form an abelian group under the connected sum operation. This group is denoted bP_m. It was shown by Kervaire and Milnor in [5] that $bP_{odd} = 0$, bP_{4k+2} is either 0 or $\mathbb{Z}_2$ (depending on k), and bP_{4k} is cyclic. In [4] Hernandez showed that a certain class of Brieskorn manifolds carry Ricci positive metrics. This class includes homotopy spheres representing the non-trivial element of those groups bP_{4k+2} which are isomorphic to $\mathbb{Z}_2$ (a case previously covered by Cheeger in [3]]), as well as many elements in bP_{4k}. Until now, however, it was an open question whether in fact all such homotopy spheres admit Ricci positive metrics. Theorem 2.1 will actually

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