STRONGLY ISOSPECTRAL MANIFOLDS WITH NONISOMORPHIC COHOMOLOGY RINGS

E. A. LAURET, R. J. MIATELLO AND J. P. ROSSETTI

Abstract

For any $n \geq 7$, $k \geq 3$, we give pairs of compact flat n-manifolds M, M' with holonomy groups $\mathbb{Z}_2^k$, that are strongly isospectral, hence isospectral on p-forms for all values of p, having nonisomorphic cohomology rings. Moreover, if n is even, M is Kähler while M' is not. Furthermore, with the help of a computer program we show the existence of large Sunada isospectral families; for instance, for $n = 24$ and $k = 3$ there is a family of eight compact flat manifolds (four of them Kähler) having very different cohomology rings. In particular, the cardinalities of the sets of primitive forms are different for all manifolds.