

# Geometric formality of manifolds in small dimensions

Svjetlana Terzić

*University of Montenegro, Faculty of Natural Sciences and Mathematics,  
Podgorica, MONTENEGRO*  
[sterzic@ac.me]

A closed oriented manifold  $M$  is said to be geometrically formal if it admits a Riemannian metric for which all wedge products of harmonic forms are again harmonic forms. Geometrically formal manifolds are formal in the sense of rational homotopy theory. If  $M$  is a geometrically formal manifold of dimension  $\leq 4$ , then it is known that  $M$  has the real cohomology algebra of a compact symmetric space. We consider the question of geometric formality for simply connected manifolds of dimension 5, 6 and 7. We also assume these manifolds to be rationally elliptic, which simplifies their real cohomology structure. The manifolds of dimensions 5 and 6 are known to be rationally formal and we prove that any such geometrically formal manifold has the real cohomology structure of a symmetric space. In dimension 7 we study this question on homogeneous spaces and biquotients.

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