

Rational formality and special holonomy

Manuel Amann

January 26th, 2010

Basically, due to a famous result of Berger the possible holonomy groups of (simply-connected) Riemannian manifolds are well-known. These special geometries—featuring prominent examples like Kähler manifolds or Joyce manifolds—often do possess remarkable topological properties.

In this talk I shall discuss one property which virtually all these manifolds might have in common and which stems from Rational Homotopy Theory—namely formality. This expresses the fact that rationally the homotopy theory of these spaces might be no more complicated than their cohomology theory.

After providing necessary concepts and giving an overview of the subject, I shall present new results including the formality of Positive Quaternion Kähler Manifolds. The proof of this result will naturally prompt the question of how to find non-formal homogeneous spaces.