EXOTIC NEARLY KÄHLER STRUCTURES ON THE 6-SPHERE AND THE PRODUCT OF TWO 3-SPHERES

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Abstract: Compact 6-dimensional nearly Kähler manifolds are the cross-sections of Riemannian cones with G_2 holonomy. Viewing Euclidean 7-space as the cone over the round 6- sphere endows the latter with a nearly Kähler structure which coincides with the standard G_2-invariant almost complex structure induced by octonionic multiplication. A long- standing problem has been the question of existence of complete nearly Kähler 6- manifolds besides the four known homogeneous ones. We resolve this problem by proving the existence of an exotic (inhomogeneous) nearly Kähler structure on the 6-sphere and on the product of two 3-spheres. This is joint work with Mark Haskins, Imperial College London.