

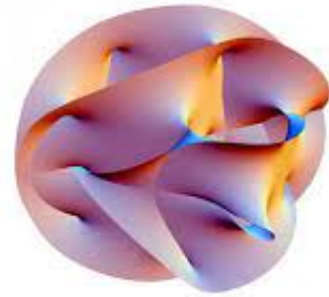
Oberseminar Geometrie

Department of Mathematics

University of Fribourg

Seminar Room 0.05 PER23

Wednesday, 20 December 2023, 10:20



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Exotic smooth structures on the 7-sphere

Given two smooth manifolds which are homeomorphic to one another, is it possible to prove they also must be diffeomorphic - thereby strengthening the quality of this equivalence? In a paper from 1956, Milnor presents a family of counterexamples; thus, a manifold which admits at least one smooth structure may admit many. In particular, Milnor constructs a family of 7-manifolds which are topologically equivalent to the 7-sphere but which carry smooth structures distinct from that of the standard smooth S^7 .

We show how Milnor constructed these first examples of (so-called) exotic spheres, and how Eells & Kuiper later developed an invariant which may be used to classify the exotic 7-spheres, up to diffeomorphism. To end, an overview of Grove & Ziller's proof that Milnor's exotic spheres admit nonnegative sectional curvature is given.