

Minicourse at IMAR, August 2017

Martin Palmer

Title: Introduction to exotic spheres

Abstract:

This is a condensed version of a lecture course that I gave recently. The aim of the first half (roughly the first two talks) will be to introduce the “groups of homotopy spheres” Θ_n (and their relation to the different versions of the Poincaré conjecture), and then describe four methods of constructing exotic spheres (twisted spheres; Milnor’s original construction using sphere bundles over spheres; plumbing; links of singularities) and two invariants to distinguish them. The aim of the second half (the third and fourth talks) will be to prove the theorem of Kervaire and Milnor that Θ_n is a finite group for all n . Step one of the proof involves cobordism groups and the Pontrjagin-Thom construction; step two involves surgery theory, the signature and the Arf invariant.

*Mathematisches Institut der Universität Bonn
Endenicher Allee 60
53115 Bonn
Germany*

palmer@math.uni-bonn.de