Topology Seminar

Jianfeng Lin and Zhouli Xu

of MIT will be speaking on

The geography problem on 4-manifolds: $10/8 + 4$

on October 29 at 3:30 in
MIT Room 4-153

A fundamental problem in 4-dimensional topology is the following geography question: "which simply connected topological 4-manifolds admit a smooth structure?" After the celebrated work of Kirby-Siebenmann, Freedman, and Donaldson, the last uncharted territory of this geography question is the "$11/8$-Conjecture". This conjecture, proposed by Matsumoto, states that for any smooth spin 4-manifold, the ratio of its second-Betti number and signature is least $11/8$.

Furuta proved the "$10/8+2$"-Theorem by studying the existence of certain $Pin(2)$-equivariant stable maps between representation spheres. In this talk, we will present a complete solution to this problem by analyzing the $Pin(2)$-equivariant Mahowald invariants. In particular, we improve Furuta's result into a "$10/8 + 4$"-Theorem. Furthermore, we show that within the current existing framework, this is the limit. This is joint work with Mike Hopkins and XiaoLin Danny Shi.

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