

Andrea Bianchi, MPG Bonn

Title: Poincaré duality pairs via twisted ambidexterity.

Abstract: The notions of Poincaré duality spaces and pairs, introduced by Browder, Spivak and Wall in the 1960s, capture the essential features of the underlying homotopy type of a closed manifold and a compact manifold with boundary, respectively. Wall's definition, which has become standard for both concepts, is given in terms of an isomorphism between twisted homology and cohomology induced by cap product with a (suitably twisted) fundamental class. Klein has introduced a convenient alternative definition of Poincaré duality spaces in the early 2000s: a space X is Poincaré if the limit functor $X_*: \mathbf{Sp}^X \rightarrow \mathbf{Sp}$ is colimit preserving and if its classifying system takes values in $\mathrm{Pic}(\mathbf{Sp})$. This "modern" definition of Poincaré duality seems to miss a neat counterpart in the literature for Poincaré duality pairs, and the first goal of the talk is to provide such a definition. As a proof of concept, I will sketch simple proofs of several known facts about Poincaré duality pairs, including various gluing and fibration principles, and extend their validity to arbitrary stable presentably symmetric monoidal categories. The talk is based on joint work with Hilman, Kirstein and Kremer.