

Meeting: 998, Houston, Texas, SS 7A, Special Session on Low Dimensional Topology

998-57-396 **Fernando J. O. Souza*** (fernando-souza@uiowa.edu), Department of Mathematics, 15 MLH, University of Iowa, Iowa City, IA 52242-1419. *On the relationship between 3-manifolds and Hopf-algebra objects.* Preliminary report.

Several constructions of topological invariants of 3-manifolds have been developed in the last two decades as part of the area known as Quantum Topology. They often involve auxiliary data that, ultimately, come from categories suitably structured. Some invariants use categorical structures found, for example, in categories of representations of certain Hopf algebras, including the Barrett-Westbury and Lyubashenko invariants, which subsumed various constructions. The Kuperberg invariant, and the Kauffman-Radford and Sawin reformulations of the Hennings invariant are built using Hopf-algebra objects directly.

A lot about these invariants is yet to be studied, including their algebraic topology for many examples of auxiliary data, as well as some gaps in the relationship between them. Nevertheless, they can be remarkably sharp. For instance, the most general (diagrammatic) form of the involutory Kuperberg invariant is complete for oriented, closed 3-manifolds, providing these with an algebraic formulation. Also, Crane, Kerler, and Yetter have developed an on-going algebraicization of 3-manifolds.

We will summarize the present state of the subject, and report our current efforts to clarify the relationship between 3-manifolds and Hopf-algebra objects.

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