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The geometric cobordism hypothesis

I will explain my recent work with Daniel Grady on locality of functorial field theories (arXiv:2011.01208) and the geometric cobordism hypothesis (arXiv:2111.01095). The latter generalizes the Baez–Dolan cobordism hypothesis to nontopological field theories, in which bordisms can be equipped with geometric structures, such as smooth maps to a fixed target manifold, Riemannian metrics, conformal structures, principal bundles with connection, or geometric string structures. Applications include a generalization of the Galatius–Madsen–Tillmann–Weiss theorem, a solution to a conjecture of Stolz and Teichner on representability of concordance classes of functorial field theories, a construction of power operations on the level of field theories (extending the recent work of Barthel–Berwick-Evans–Stapleton), and a recent solution by Grady of a conjecture by Freed and Hopkins on deformation classes of reflection positive invertible field theories. If time permits, I will talk about the planned future work on nonperturbative quantization of functorial field theories and generalized Atiyah–Singer-style index theorems.

Author: PAVLOV, Dmitri

Presenter: PAVLOV, Dmitri