

Stanford Department of Mathematics Colloquium

HIGHER GAUGE THEORY

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Abstract

Gauge theory describes the parallel transport of point particles using the formalism of connections on bundles. In both string theory and loop quantum gravity, point particles are replaced by 1-dimensional extended objects: paths or loops in space. This suggests that we seek some sort of “higher gauge theory” that describes parallel transport as we move a path through space, tracing out a surface. To find the right mathematical language for this, we must “categorify” concepts from topology and geometry, replacing smooth manifolds by smooth categories, Lie groups by Lie 2-groups, bundles by 2-bundles, and so on. Some interesting examples of these concepts show up in the mathematics of topological quantum field theory, string theory and 11-dimensional supergravity.

Thursday, December 7

4:15 p.m.

Room 380-W

<http://math.stanford.edu/coll/0607/>