BOSTON UNIVERSITY GEOMETRY AND PHYSICS SEMINAR

A LOOP SPACE APPROACH TO LOCALIZATION OF CHERN-SIMONS THEORY ON CIRCLE BUNDLES

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Apr 29, 2015, 4:00 – 5:00pm
Math/Computer Science, Room 148
111 Cummington Street, Boston

Tea: 3:45pm in Room MCS 144

Abstract: Chern-Simons theory is a 3d TQFT that can be used to compute knot invariants such as the Jones polynomial, as shown by Witten. However, such calculations involve path integral techniques, and are thus not entirely rigorous. Beasley-Witten have shown that when the underlying 3-manifold admits the structure of a principal circle bundle, the Chern-Simons path integral admits a reformulation as a non-abelian symplectic localization integral, much like what happens in the similar case of 2d Yang-Mills, and thus achieves a higher level or rigor. However, the Beasley-Witten formula is quite involved. Motivated by their formula, we show that Chern-Simons theory on these types of manifolds admits a reformulation as a 2d TQFT on the base of the circle bundle, upon which the symplectic form of the path integral is completely natural. This construction involves a gauge theory with affine Lie group gauge symmetry.

See `http://math.bu.edu/research/geom/seminar.html` or contact Ryan Grady *regrady@math.bu.edu* for more information.