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Behavior of the Chern-Simons forms under the Ricci flow.

The Chern-Simons forms are odd-dimensional secondary characteristic classes. While they are elements of cohomology group, they are determined by the connection and curvature forms of a manifold. Chern and Simons showed that this form is a geometric invariant (and is a gauge invariant modulo addition of an integer).

To gain a better understanding of these forms, the author studies the behavior of the forms as the Ricci flow is applied to them. In particular, this behavior is examined on warped products of spheres, Berger collapsed spheres, and generalizations of the Berger spheres. (Received September 22, 2009)