

The Ricci flow on four-manifolds and the Seiberg-Witten equations

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A solution to the normalized Ricci flow is called non-singular if the solution exists for all time and the Riemannian curvature tensor is uniformly bounded. In 1999, R. Hamilton introduced this notion as a nice class of solutions and classified 3-dimensional non-singular solutions. In this talk, we shall consider non-singular solutions in dimension 4. By using gauge theoretical invariants associated with the Seiberg-Witten equations, we shall prove obstructions to the existence of non-singular solutions and give several applications of the obstructions. One of the main ingredients of the proof is LeBrun’s curvature bounds derived from the Seiberg-Witten equations. If time allows, we shall also discuss obstructions coming from a twisted version of the Seiberg-Witten equations and related problems.

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