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The Kähler-Ricci flow on manifolds with positive first Chern class:

Some open problems

1. One of the main problems in the field, which is essentially equivalent to a long-standing conjecture of Yau, is as follows: find algebraic conditions on a manifold with positive first Chern class which are necessary and sufficient for convergence of the Kähler-Ricci flow to a Kähler-Einstein metric (or Kähler-Ricci soliton).
2. Is the Ricci curvature always uniformly bounded along the Kähler-Ricci flow? What about the full curvature tensor? Can one find an example where the curvature blows up along the Kähler-Ricci flow?
3. The Kähler-Ricci flow decreases the Mabuchi energy functional, which is key to understanding notions of stability. If the Mabuchi energy is bounded from below on the space of Kähler metrics, does the Kähler-Ricci flow always approach the infimum of the Mabuchi energy as time goes to infinity?