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The evolution of APEs and the Hawking-Page transition

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APEs are Asymptotically Poincar\'e-Einstein manifolds. I will first review the zoology of APEs and their relatives, which are various classes of Conformally Compactifiable manifolds. I will show that APEs have nice properties under the Ricci flow. Namely, if a manifold is initially APE, it remains APE under the flow, and if the mass is defined then it is monotonic. The conformal anomaly, by contrast, is constant. If the Ricci curvature of an APE obeys the natural lower bound Ric \ge -(n-1) initially, then this bound is preserved under the flow and the renormalized volume becomes monotonic. This has a nice interpretation for the Hawking-Page phase transition in black hole physics. This is based on joint work with Eric Bahuaud and Rafe Mazzeo, and joint work with Tracey Balehowsky.

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