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Ricci flow of the RP3 geon, and beyond

The Ricci flow has proved to be a powerful tool in Riemannian geometry, at least on compact manifolds. Application to problems in general relativity requires dealing with several issues, including the presence of boundaries and asymptotic regions and (sometimes) the signature of the metric. For example, the presence of an asymptotically flat region modifies the standard proof that the Ricci flow of a compact 3-manifold with essential minimal surface present must terminate in finite time, leaving open (for now at least) the possibility that, for certain initial data, this flow could be immortal. I will discuss this result (including the Ricci flow of the RP3-geon model) and provide results of a numerical investigation. Time permitting, I will also pose some questions that arise from efforts to apply Ricci flow to general relativity and string theory.

Based on joint work with Tracey Balehowsky.