Volume preserving curvature flows of hypersurfaces

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We consider the evolution of a hypersurface with speed given by a function of the principal curvatures, such as the mean curvature flow. We focus the attention on the so-called volume preserving flows, where the speed includes an additional nonlocal term which keeps the enclosed volume constant.

The additional term of the volume preserving case induces some difficulties in the analysis. Some properties of the standard flows based on the maximum principle, such as the avoidance principle, no longer hold in the volume preserving case. On the other hand, volume preserving flows often possess some new monotone quantities which are important in the asymptotic analysis.

In this talk we present some recent results on the convergence of convex hypersurfaces to a sphere for volume preserving flows. We show that the monotonicity property allows to prove convergence by simpler arguments and in a more general setting than what is known for the corresponding standard (non volume-preserving) flows.