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Topological Change in Mean Convex Mean Curvature Flow

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Consider the mean curvature flow of an (n+1)-dimensional, compact, mean convex region in Euclidean space (or, if n<7, in a Riemannian manifold). We prove that elements of the m-th homotopy group of the complementary region can die only if there is a shrinking $S^k \times R^{(n-k)}$ singularity for some k less than or equal to m. We also prove that for each m from 1 to n, there is a nonempty open set of compact, mean convex regions K in $R^{(n+1)}$ with smooth boundary for which the resulting mean curvature flow has a shrinking $S^m \times R^{(n-m)}$ singularity.

Comments:	19 pages. This version includes a new section proving that certain kinds of mean curvature flow singularities persist under arbitrary small perturbations of the initial surface
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