Free boundary flows by powers of the Gauss curvature in the unit ball

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We study smooth compact strictly convex hypersurfaces in the unit ball that meet the support sphere orthogonally and evolve by the α-Gauss curvature flow. We prove that for any $\alpha > 0$ the solution remains strictly convex, becomes extinct in finite time and contracts to a single point on the support sphere. If $\alpha > 1/(n+2)$, we apply a Cayley-type conformal map that sends the extinction point to the origin of a Euclidean half-space and then normalize the enclosed half-space volume. The resulting normalized hypersurfaces converge smoothly to the unit hemisphere. The proof combines boundary identities for the spherical free boundary, a boundary-adapted Tso estimate, an almost-monotonicity formula for a half-space entropy, and uniform curvature estimates for the normalized flow.

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References

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