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Hastings-Levitov aggregation in the small-particle limit

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We establish some scaling limits for a model of planar aggregation. The model is described by the composition of a sequence of independent and identically distributed random conformal maps, each corresponding to the addition of one particle. We study the limit of small particle size and rapid aggregation. The process of growing clusters converges, in the sense of Caratheodory, to an inflating disc. A more refined analysis reveals, within the cluster, a tree structure of branching fingers, whose radial component increases deterministically with time. The arguments of any finite sample of fingers, tracked inwards, perform coalescing Brownian motions. The arguments of any finite sample of gaps between the fingers, tracked outwards, also perform coalescing Brownian motions. These properties are closely related to the evolution of harmonic measure on the boundary of the cluster, which is shown to converge to the Brownian web.

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