Regular and irregular splashing of drop impacts with geometric targets

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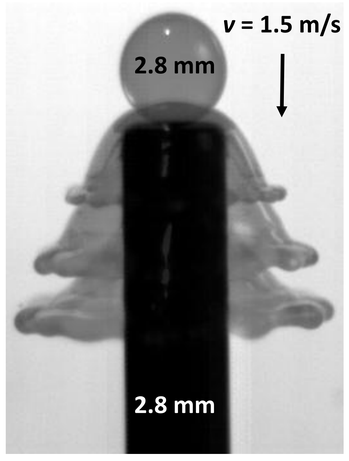
Side view



Reynolds number

Re = $\rho v D/\mu$ = 550

Weber number

We = $\rho v^2 D/\gamma$ = 250

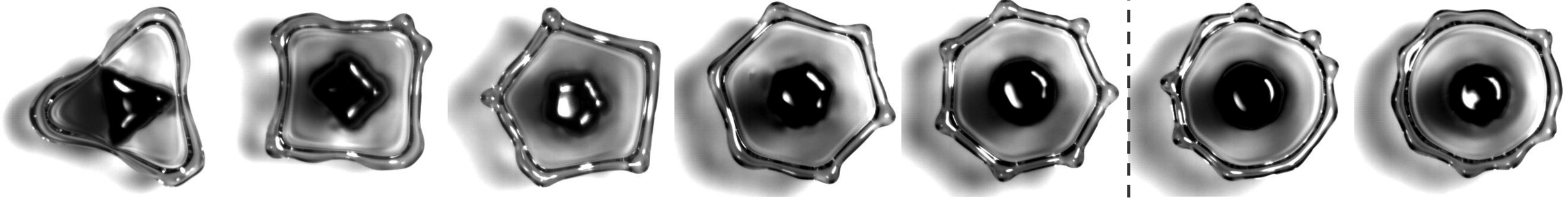
The irregular splash that results from the impact of a water drop on a solid planar surface can be controlled using surfaces with length scales comparable to the drop diameter. The drop falls on a target with a regular polygonal cross-section, from a triangle (n = 3) up to a decagon (n = 10), where n is the number of vertices. Geometrically-shaped lamellae and a transition in splashing stability, from regular to irregular, is observed. The resulting splash becomes irregular for $n \geq 8$, when the perturbation due to the target is overtaken by the most unstable Plateau-Rayleigh mode.

Regular splashing **($3 \leq n < 8$)** ⟵

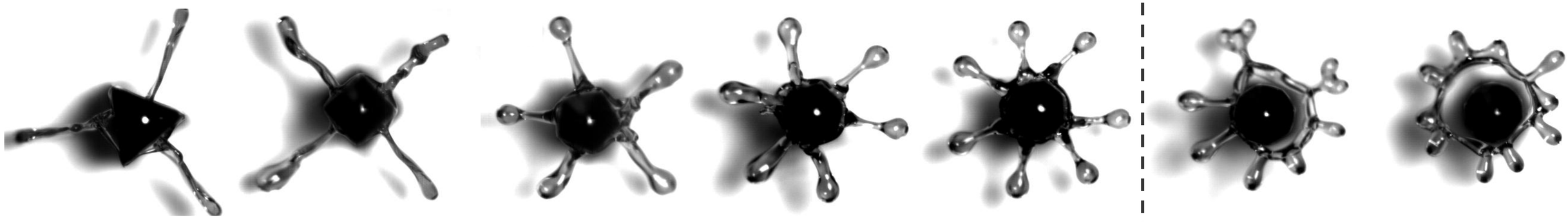
Irregular splashing **($n \geq 8$)** ⟶

Top view

Geometrically-shaped lamellae at maximum expansion



Filaments form after lamellae break up



***n* = 3** ***n* = 4** ***n* = 5** ***n* = 6** ***n* = 7** ***n* = 8** ***n* = 10**