Electronic Supplementary Material (ESI) for Soft Matter.
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Supplementary materials for

"Controlling the residence time of a bouncing drop with asymmetric shaping"

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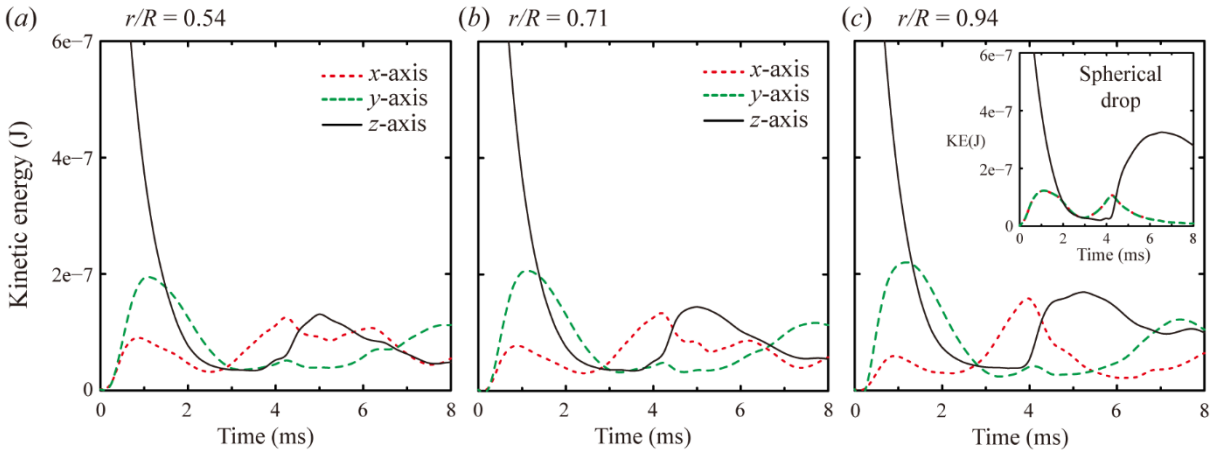

Fig. S1. Temporal variation of the kinetic energy (KE) at (a) r/R = 0.54, (b) r/R = 0.71, and (c) r/R = 0.94. In the initial spreading process, the KE of the *y*-axis increases because of the wider spreading of liquid mass in the *y*-axis than the *x*-axis (t ~ 1 ms). The retraction along the *x*-axis leads to the increase in KE of the *x*-axis, thereby resulting in the liquid alignment (t ~ 4 ms). During the aligning process, a great discrepancy of KE between the horizontal axes can enable liquid to be well-aligned along the *y*-axis before bouncing. The asymmetrical drops show KE transfer between the horizontal principal axes, thereby reducing the KE of the vertical (z) axis, compared with the spherical drop (inset of (c)). A decrease in asymmetry (r/R is close to unity) causes the increase in the discrepancy of KE between the horizontal axes in the spreading and retraction process, as commonly shown at t = 1 ms and 4 ms. The finding means that the low asymmetry of the shape (close to elliptical shapes) leads to a high degree of the symmetry breaking in mass and momentum.

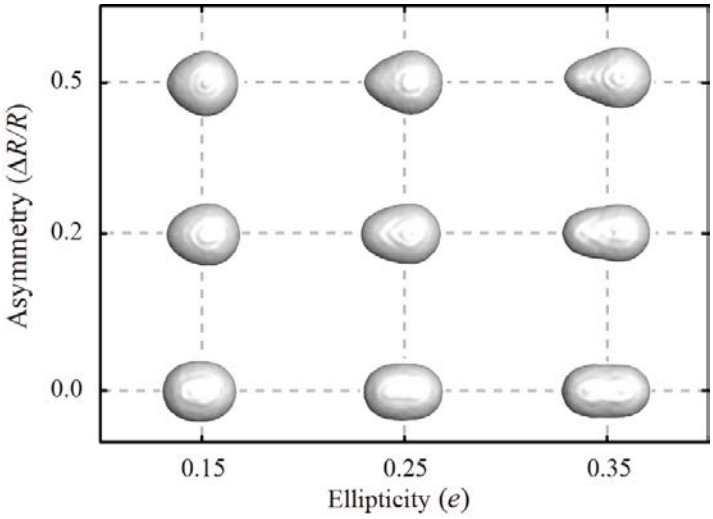

Fig. S2. The egg-shape with the ellipticity (e) and asymmetry ($\Delta R/R$) on the basis of the geometric model of the shape used in this work. The egg shape can be decomposed into the ellipticity and asymmetry, which can be represented by e (= $1 - (L/D)^{-3/2}$) and $\Delta R/R$ (= $1 - r/R$), respectively.