

Bifurcated bubbling

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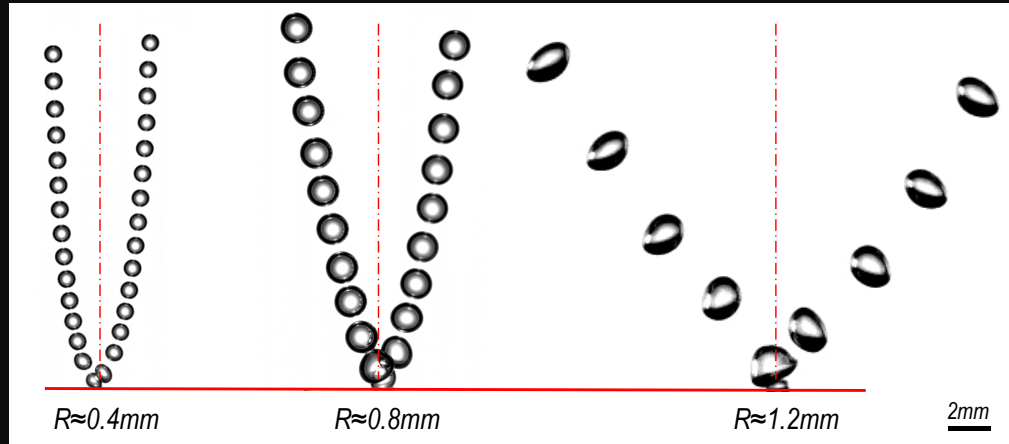
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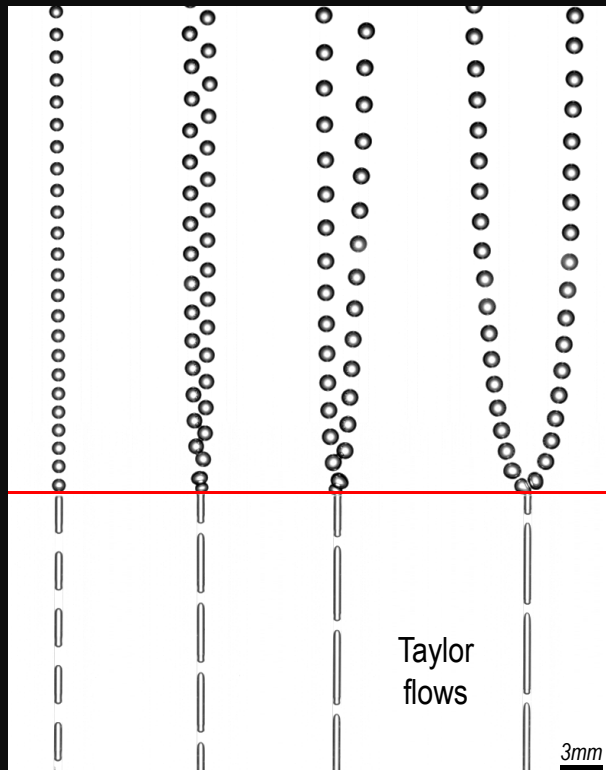
Must bubbling behave as a single chain of vertical rising bubbles?

We found bifurcated bubbling which comes from Taylor flows injecting into liquid with:

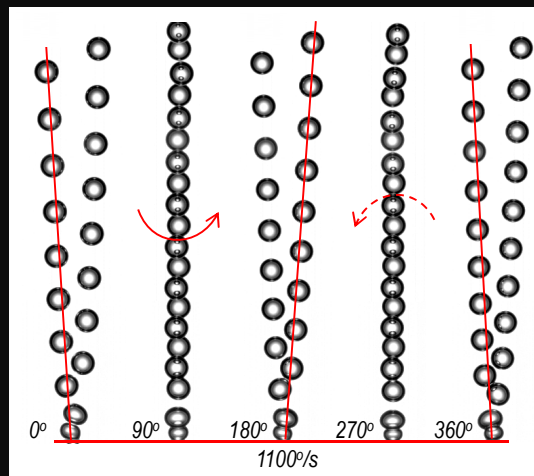
- Various bifurcation angles
 - Various bubble radius R
 - Bubble chains rotation
 - Even unequal R
 - Even 3 chains
- } Symmetry
- } Asymmetry



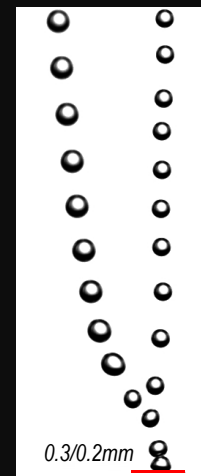
Various bubble radius R



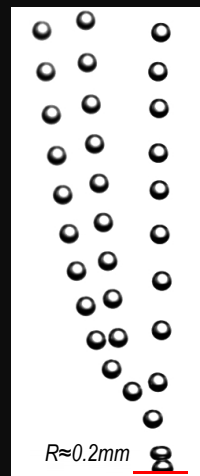
Various bifurcation angles



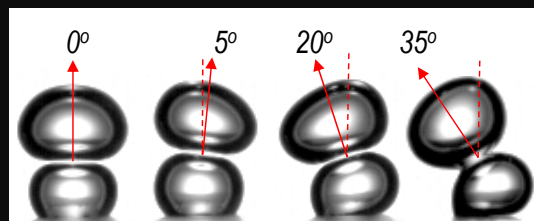
Bubble chains rotation



Unequal R



3 chains



Physical reason: bubble interaction

The New Bubbling
One nozzle,
More chains,
More orientations.