

## Bubble Penetration Through a Single Layer Sphere Bed

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The stability criteria for a droplet passing through a tightly packed sphere monolayer, as seen in figure 1, are computed numerically. The *Surface Evolver* software is programmed to compute droplet shape and the corresponding stability properties under the influence of gravity. A solution for a near square packed geometry is shown in figure 2. Sphere configurations from square to near hexagonal packing angles are considered. For a fixed volume and liquid contact angle, regions of stability are determined for a range of packing angles and Bond numbers. Furthermore due to the droplet forming contact lines with spheres, seven droplet topologies are compared to determine the lowest energy solution. This work compliments existing literature of a liquid infiltrating a sphere layer.

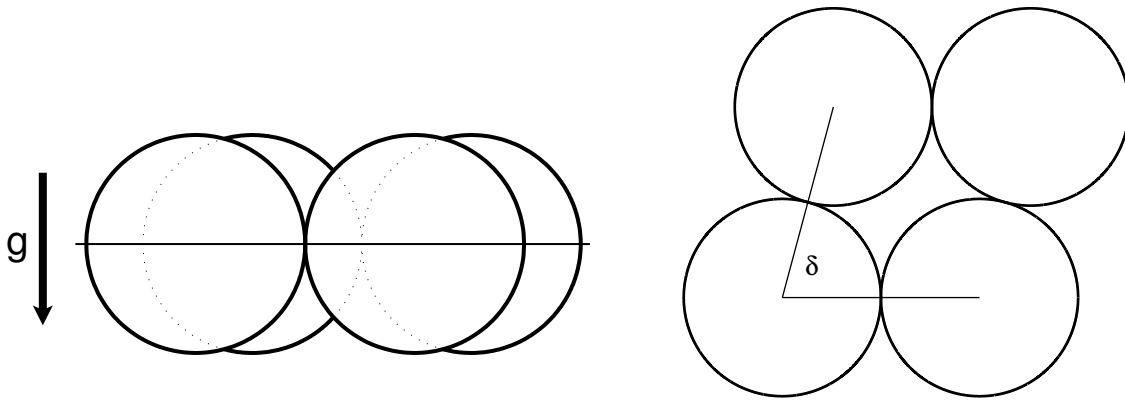


Figure 1: Top and side views of sphere layer

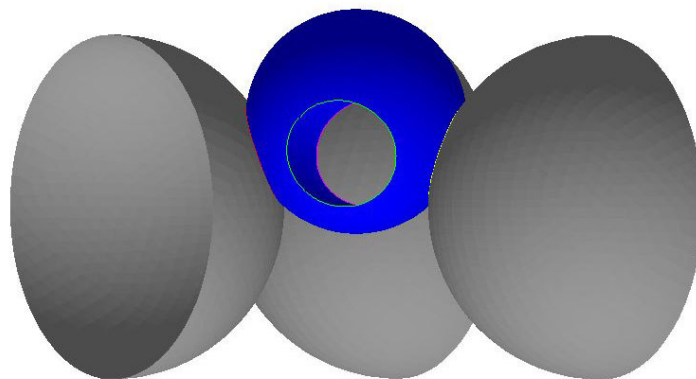


Figure 2: Sample solution from Surface Evolver package