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Smooth contact and buckling in asymmetric bubble break-up WENDY ZHANG, LIPENG LAI, University of Chicago — When an underwater bubble breaks up, the final dynamics is dominated by shape vibrations excited by initial asymmetries. As a result, the break-up is qualitatively different from that observed for a typical liquid drop. The dynamics does not evolve towards a universal singularity, one independent of initial and boundary conditions. Instead, the shape vibrations create a variety of final dynamics. We use theory and simulation to enumerate the different possible break-up modes for a simple class of initial distortions. For some initial conditions, the break-up is severely asymmetric. An initially nearly cylindrically-symmetric bubble neck implodes into a thin air sheet. The thin air sheet subsequently fails in two distinct modes. The opposite sides of the interface can contact smoothly and break the air sheet up into several pieces, reminiscent of coalescence. More surprisingly, the thin edge of the sheet can also "buckle" inwards, as if it were a solid shell.

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