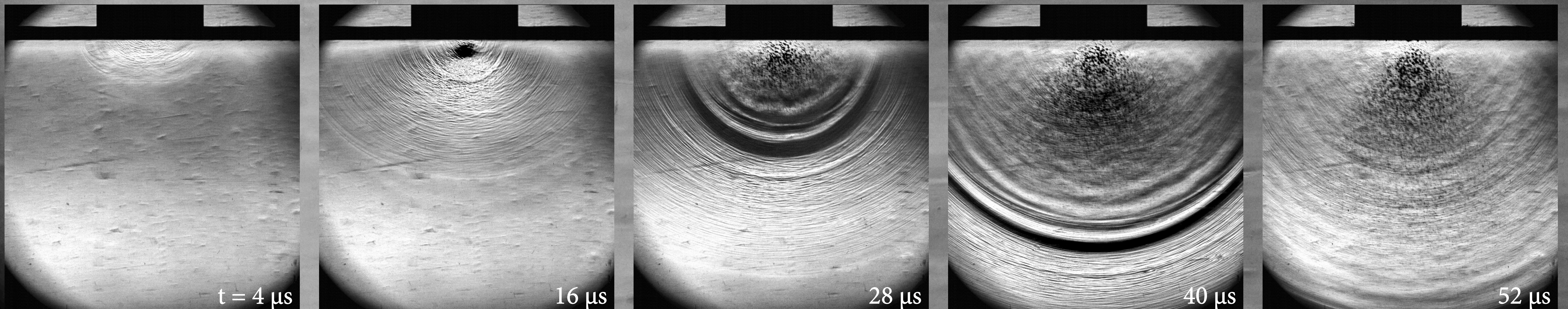


Smashed into vapor

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A flat-bottomed cylinder smashes into the free surface of a pool of water at ~ 9 m/s creating an intense pressure wave and a cloud of vaporous cavitation bubbles in the image above. The 20 mm cylinder makes initial contact ($t = 0 \mu\text{s}$) around the circumference due to the central entrapped air disc (not shown) forming numerous small pressure waves (at $4 \mu\text{s}$ in the image sequence). These pressure waves propagate radially outward (16 - $28 \mu\text{s}$), summing together to form a high pressure wavefront as revealed by the bright striations in the schlieren images shown here. The subsequent low pressure region, manifested by the

prominent dark band, induces cavitation (28 - $52 \mu\text{s}$) when sufficiently below the vapor pressure. Cavitation occurs at atmospheric pressure, shown in the sequence, but is more pronounced under reduced pressure ($1/3$ bar) as shown in the main image. The wave travels away from the cylinder at the speed of sound and the bubbles grow and collapse all before the first sound of impact can even leave the water-filled tank.

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