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**Formation and Collapse of a depth-limited cavity generated by a supercavitating projectile**[1] DERRICK TREICHLER, KEN KIGER, University of Maryland, DAVID HAN, U.S. Naval Academy — The formation and collapse of the cavity created by the impact of a high-speed projectile entering water is studied experimentally in a 1-meter deep water tank, with a goal of predicting the transient pressure history in the vicinity of the dart impact point. The projectiles were fired vertically using pressurized helium at speeds ranging 200 m/s to 450 m/s. Nose diameters of 6 mm and 12 mm were tested. Projectile motion was captured using a high-speed camera at 5,000 frames per second. Pressure histories were sampled at a rate of 200 kHz at six positions within the tank using piezoelectric transducers. Apparent cavity shapes are digitized from high speed images to produce a time record of cavity radius at each depth in the tank. Results show that the cavity radius scales nominally with the rate of energy loss of the projectile and that the collapse time scales with an adjusted form of Rayleigh's model for the collapse of an infinite cylindrical bubble.

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