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Impact of solid objects on water: The influence of air IVO PETERS, GEKLE STEPHAN, University of Twente, The Netherlands, JOSÉ GORDILLO, University of Seville, Spain , JACCO SNOEIJER, DEVARAJ VAN DER MEER, DETLEF LOHSE, University of Twente, The Netherlands — Upon the impact of a disk on a water surface a cavity is created which collapses under the influence of the hydrostatic pressure. This eventually leads to the formation of a neck connecting the entrapped air pocket above the disk with the surroundings. The collapsing cavity walls push out air at an increasing speed as the neck narrows towards the pinch-off point. Using high-speed imaging we investigate the influence of the air flow on the collapse. At high air speeds, we observe a characteristic nose-like deformation of the cavity wall which is also found in numerical boundary integral calculations that include both water and air. The neck radius at which this nose appears can be predicted using a similar kinetic energy argument as was presented in J.M. Gordillo et al., Phys. Rev. Lett. 95, 194501 (2007).

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