Abstract Submitted
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Diving wedges[1] LIONEL VINCENT, EVA KANSO, University of Southern California — Diving induces large pressures during water entry, accompanied by the creation of cavitybehind the diverand water splash ejected from the free water surface. To minimize impact forces, divers streamline their shape at impact. Here, we investigate the impact forces and splash evolution of diving wedges as a function of the wedge opening angle. A gradual transition from impactful to smooth entry is observed as the wedge angle decreases. After submersion, diving wedges experience significantly smaller drag forces (two-fold smaller) than immersed wedges. We characterize the shapes of the cavity and splash created by the wedge and find that they are independent of the entry velocity at short times, but that the splash exhibits distinct variations in shape at later times. Combining experimental approach and a discrete fluidparticlemodel, we show that the splash shapeis governed bya destabilizing Venturi-suction force due to air rushing between the splash and the water surface and a stabilizing force due to surface tension. These findings may have implications in a wide range of water entry problems, with applications in engineering and bio-related problems, including naval engineering, disease spreading and platform diving.

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