

Abstract Submitted
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Impact with dynamic surface tension LAURENT DUCHEMIN,
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IRPHE, Marseille, France — We study impacts of a rigid body on a thin elastic
sheet floating on a liquid. When struck by a solid object of small size, the elastic
sheet deforms and waves propagate in and on the membrane. The impact triggers
a longitudinal elastic wave effectively stretching the membrane. The hydro-elastic
transverse wave that propagates in the stretched domain is similar to capillary waves
on a free surface with an equivalent “surface tension” that results from the stretching
of the elastic membrane. Two limiting cases, for which a self-similar solution can be
computed, corresponding to short and long times are identified. Surprisingly, our
study reveals that the fluid-body system behaves as a regular liquid-gas interface,
but with an effective surface tension coefficient that scales linearly with the impact
velocity.

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