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Maximum drop radius and critical Weber number for splashing in the dynamical Leidenfrost regime GUILLAUME RIBOUX, JOSE MANUEL GORDILLO, Escuela Superior de Ingenieros, Universidad de Sevilla, Spain — At room temperature, when a drop impacts against a smooth solid surface at a velocity above the so called critical velocity for splashing, the drop loses its integrity and fragments into tiny droplets violently ejected radially outwards. Below this critical velocity, the drop simply spreads over the substrate. Splashing is also reported to occur for solid substrate temperatures above the Leidenfrost temperature, T, for which a vapor layer prevents the drop from touching the substrate. In this case, the splashing morphology largely differs from the one reported at room temperature because, thanks to the presence of the gas layer, the shear stresses on the liquid do not decelerate the ejected lamella. Our purpose here is to predict, for wall temperatures above T, the dependence of the critical impact velocity on the temperature of the substrate as well as the maximum spreading radius for impacting velocities below the critical velocity for splashing. This is done making use of boundary integral simulations, where the velocity and the height of the liquid layer at the root of the ejected lamella are calculated numerically. This information constitutes the initial conditions for the one dimensional mass and momentum equations governing the dynamics of the toroidal rim limiting the edge of the lamella.

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