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How a laser pulse deforms a liquid drop HANNEKE GELDERBLOM, WILCO BOUWHUIS, ALEXANDER L. KLEIN, DETLEF LOHSE, Physics of Fluids, Faculty of Science & Technology, University of Twente, The Netherlands, EMMANUEL VILLERMAUX, Aix-Marseille Université, IRPHE, France, HENRI LHUISSIER, Matiere et Systemes Complexes, Université Paris Diderot, France, JACCO H. SNOEIJER, Physics of Fluids, Faculty of Science & Technology, University of Twente, The Netherlands — When a liquid drop is hit by a ns laser pulse it experiences a strong pressure kick. As a consequence, the drop is propelled forward and deforms into a thin sheet that eventually becomes unstable and fragments. We aim to understand how the drop motion, deformation and fragmentation depend on the laser-pulse properties and drop characteristics. On the time scale of the laser pulse, where the drop dynamics is purely inertial, an analytical expression for the internal velocity field is obtained. The output of this inertial model is then used as input for a later-stage model that describes the surface-tension limited expansion of the liquid sheet. In the intermediate regime, where the drop is not a sheet yet, its shape evolution is investigated with a boundary integral method. The drop deformation dynamics described by these models is the starting point to study the subsequent drop fragmentation.

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