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Fine Transport of Matter in Drop Splashes

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Fine structure of the drop splashes and transport of matter from drop and accepting drop target fluid are studied by fast video- and photography methods. Degassed tap water, solutions of miscible dyes and sunflower oil were used as fluid-target. Impact of clean and dyed tap water, dyed alcohol changing the surface tension and oil drops was investigated. Deformation of shapes of contacting with target fluid surface drops and contact line form were registered from above and below. Subsequent evolution of flow pattern including formation and decay of crater, circular rim with crown, arising central thick cumulative jet or thin streamer jets, different groups of capillary waves are registered in a wide range of the free falling height of the drop. In matter propagation attention was paid to visualization of regular radial colored jets streaming from domain of initial contact of the drop. Two main types of flows that are relatively large scale flow defined by the drop diameter and very fine high velocity flows deforming a free surface are identified. Effects of surface tension gradients on the drop dye propagation pattern are demonstrated and discussed.