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Breakfast patterns of frozen impacted drops VIRGILE THIEVENAZ, CHRISTOPHE JOSSERAND, THOMAS SEON, Institut d'Alembert, CNRS UPMC, Paris — We investigate experimentally the solidification of a water drop during its impact on a sub-zero cooled metallic plate. As the drop impacts the substrate, a first thin layer of ice builds-up in the briefest moment. Afterwards, the competition between the liquid solidification and its retraction on this ice layer leads to a variety of frozen drop patterns. Typically, with a change of temperature the drop can freeze into a fried egg or a doughnut shape. These frozen motifs experience different sizes and can even disappear so only the thin pancake remains. These patterns have been explored through a range of parameters such as : plate temperature, thermal properties, drop size and impact velocity. Phase-diagrams show the range and the transition temperatures between the different patterns as a function of those parameters. The experimental results are discussed using a scaling law approach, allowing basic understanding of the underlying physics.

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