# CRATER PATTERNS OF FROZEN IMPACTED DROPS

**V. Thiévenaz, C. Josserand and T. Séon**
CNRS, UPMC, Institut d'Alembert, Paris, France

When a water drop lands and spreads on a sub-zero cold substrate, a thin layer of ice grows between the water and the substrate. The remaining liquid then retracts on top of this pancake of ice as the water keeps freezing. The competition between capillary retraction and solidification yields a variety of patterns at the final state which resemble meteorite impact craters.

In case of slow freezing, the liquid retracts and freezes with a spherical cap shape. For quicker solidification, the ice can catch the center of the liquid before the retraction ends, leading to a ring shape. Surprisingly, while the drop does not splash at room temperature, splashing can be induced by cooling down the substrate. For the coldest temperature, most of the drop freezes upon impact, so little water is left to retract and only the initial pancake remains.