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Frozen Impacted Drop: from Fragmentation to Hierarchical Crack Patterns THOMAS SON, ELISABETH GHABACHE, CHRISTOPHE JOSSERAND, CNRS, Institut d'Alembert, Paris — We investigate experimentally the quenching of a liquid pancake, obtained through the impact of a water drop on a cold solid substrate (0°C to -60°C). We show that, below a certain substrate temperature, fractures appear on the frozen pancake and the crack patterns change from a 2D fragmentation regime to a hierarchical fracture regime as the thermal shock increases. The different regimes are discussed and the transition temperatures are estimated through classical fracture scaling arguments. Finally, a phase diagram presents how these regimes can be controlled by the drop impact parameters.

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