

22. Drop Impact (MEL 2409)

Purpose: Controlled environment volume used to study the dynamics of a droplet impacting a surface of varying wettability and temperature.

Accessories: Controlled-volume syringe pump, Pokysciences Chiller, Phantom High-Speed Camera, 300 L Nitrogen Tank, Desiccant Packets, Custom 3D Printed Container, Thermometer

Tech/Specs:

- Variable needle-sizes of varying size (6 – 26 gauge)
- Chiller capable of cooling sample to -100C
- Capturing videos/images of droplet impact/freezing dynamics up to 20,000 FPS

Operation: A flat sample is placed upon a brass-platform which is connected to the chiller-line of the Pokysciences. A temperature is selected on the chiller, and the sample is cooled to a temperature which can be read via a thermocouple/thermometer. To prevent frost formation, Nitrogen is bled into the confinement and desiccant packets are placed inside. A needle (varying in diameter to produce differing droplet sizes) is attached to the syringe pump and placed at a specific height (0 – 20 cm) above the chilled sample. The pump then feeds water to the needle, producing a droplet which eventually falls and impacts the chilled-sample. A camera (Phantom High-Speed) is placed to view the impact and subsequent freezing from either a side or top view.

