Subject title: Reactions in a Leidenfrost film

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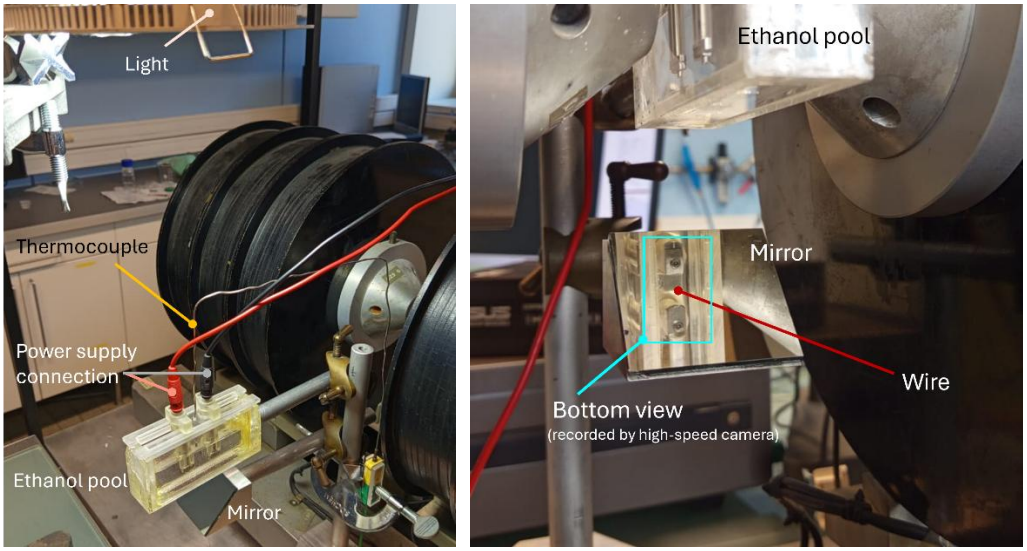
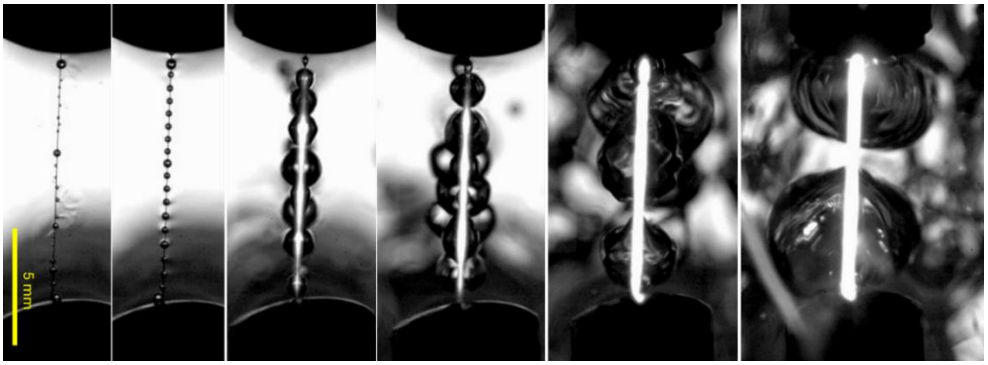
Our current research is investigating Leidenfrost effect in a particular situation, with a cylindrical micrometric wire (50 microns diameter) heated in an ambient temperature ethanol pool. When the thermal power supplied to the wire is large enough, the Leidenfrost transition occurs, manifested by a large increase of the wire temperature.



Experimental setup. The power supply is connected to the wire submerged in an ethanol pool. A mirror positioned at a 45-degree angle lets to observe the bottom. A high-speed camera is placed against the mirror to record the observed phenomenon.

The power supply is connected to the wire submerged in the ethanol tank. A thermocouple is placed close to the wire to measure the temperature in the liquid pool. A mirror is positioned at a 45-degree angle at the bottom of the tank to record the phenomenon with a high-speed camera placed against the mirror. Different regimes have been observed, as shown in the images, depending on the thermal power supplied to the wire.



Images of a wire (50 µm in diameter, distance:10 mm) in a liquid pool subjected to heating. Power increases from left to right and different regimes are observed: small bubbles, "pearl necklace", and Leidenfrost regime. The wire appears bright in the Leidenfrost regime because of its temperature (incandescence). Large bubbles detach from the film surrounding the wire in this Leidenfrost state.

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