Mini-colloque MMM13 ☒ **Oral** ☐ **Poster**

Active volatile drops on liquid baths

Benjamin Reichert[a*], Jean-Benoît Le Cam[a], Arnaud Saint-Jalmes[a] and Giuseppe Pucci[a]

a. Univ. Rennes, CNRS, IPR (Institut de Physique de Rennes) UMR 6251, FR35000 Rennes, France

* email : benjamin.reichert90@gmail.com

We demonstrate the self-propulsion of a volatile drop on the surface of a bath of an immiscible liquid. **Evaporative heat pumping is converted into directed motion through thermo-capillary stresses**, which arise from the coupling between surface-tension-driven flows and temperature advection. A propulsive force arises from convection-sustained temperature gradients along the drop interface, resulting in a warmer pool of liquid being advected by the hydrodynamic flow in the underlying bath toward the back of the drop. The dependence of the drop speed on the activity source, *i.e.* the evaporation flux, is derived with scaling arguments and captures the experimental data.

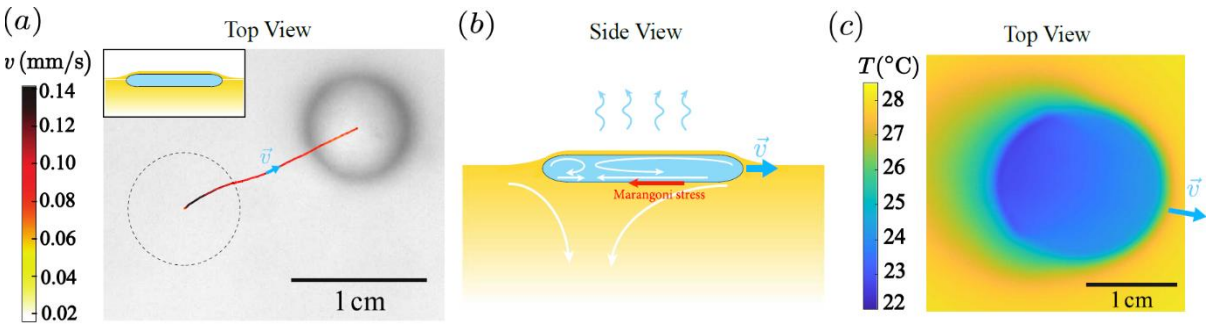

Figure 1 : (a) Top view video imaging of the self-propulsion of an ethanol drop on a silicone oil bath**; (b)** Side view schematic. Propulsion is triggered by the emergence of a Marangoni stress on the bottom interface**; (c)** Top view thermal imaging of the drop during the stationary propulsion regime. The drop cools down by evaporation and the temperature field is asymmetric.