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Experimental and numerical study of the flow instabilities during sessile droplet evaporation in microgravity.[1] SANJEEV KUMAR, MARC MEDALE, DAVID BRUTIN, Aix-Marseille University, IUSTI TEAM — Our current research is focused on thermal Marangoni instabilities in sessile ethanol and Hydrofluoroether (HFE7100) droplets, which develop spontaneously during forced evaporation. We will present the numerical modelling in 3D unsteady with moving interface of a sessile droplet under forced evaporation and showing internal flow instabilities. We assumed a pinned contact line and a spherical-cap shape of the liquid-gas interface. Our computations contribute to figure out the internal 3D flow structure in the droplet and also to determine the driving mechanism and energy sources of the observed thermo-convective instability and thus clarifies its nature. We will compare the numerical results with experimental results obtained with ARLES experiment in microgravity during the ESA SSC MASER-14 rocket campaign for the HFE7100 droplets and the parabolic flight campaign CNES VP139 and ESA VP140 for the ethanol, methanol and pentane droplets.

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Sanjeev Kumar
Aix-Marseille University

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