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Marangoni or not Marangoni? Thermal Marangoni flow measurements in evaporating drops ALVARO GOMEZ MARIN, ROBERT LIEPELT, MASSIMILIANO ROSSI, CHRISTIAN KAEHLER, Bundeswehr University Munich — Sessile evaporating droplets fascinate for the rich and complex behavior that hides behind their apparent simplicity. Although the basic physics of the coffee-stain formation can be explained assuming thermal equilibrium (Deegan, 1997), thermal effects play an important role in the flow patterns within the droplet and in the deposits left on the substrate. Understanding such flows would give a chance to add a higher degree of control in these not-so-simple systems. For example, several studies have recently suggested that such thermal Marangoni flows can be strong enough to neutralize the coffee-stain effect. Experimental work in this sense has been scarce due to the difficulty of tracking particles at the surface of the droplet, where the flow is originated. In this study we perform fully three-dimensional and time resolved particle tracking measurements of particles suspended in sessile drops of liquids on substrates with different thermal conductivity ratios. The results are compared with some of the theoretical models and simulations available in the literature. Our final aim is to precisely quantify how important is the thermal Marangoni flow in an evaporating drop and if it can be used for practical applications.

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