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**Shear-induced non-coalescence for contactless droplet bearings** MICHELA GERI, BAVAND KESHAVARZ, GARETH MCKINLEY, Mechanical Engineering, MIT — Coalescence between a drop and a bath of the same liquid can be delayed or even completely suppressed if the lubricating air layer separating the approaching liquid surfaces is replenished. Thermal Marangoni stresses can promote such scenario if an initial temperature difference is imposed between drop and bath. Even when the droplet is left to thermally equilibrate coalescence can be delayed for many seconds, with the delay time being an increasing power law of the temperature difference. Under isothermal conditions coalescence can be suppressed if the droplet is externally forced to move over the liquid surface. This motion continuously replenishes the air cushion separating the droplet and bath while inducing fluid recirculation within both liquids. We use a custom setup that allows us to carefully control the speed at which the drop is kept in motion over the bath. By pinning the droplet to a force transducer we measure the friction force that is generated by the lubricating air flow for different velocities and different fluid viscosities. We discuss our results in view of a lubrication analysis for the air flow within the gap and investigate the possibility of using this technique to generate contactless droplet bearings.

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