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Combined Gravitational and Thermocapillary Interactions of Spherical Drops with Incompressible Surfactant MICHAEL ROTHER, University of Minnesota Duluth — Collision efficiencies are calculated by a trajectory analysis for two contaminated spherical drops under the combined influence of buoyancy and a constant temperature gradient at low Reynolds number and with negligible thermal convection in the limit of nearly uniform surfactant coverage. As in the case of clean drops, a region in the parameter space exists where collisions are forbidden when the driving forces are opposed. However, because of the increased effect of thermocapillary repulsion when surfactant is present, coalescence can be inhibited even when the driving forces are aligned in the same direction. In addition to trajectories leading to coalescence and separation of the drops, closed trajectories are also observed. At parameter values where the asymmetric mobility function is zero, retrograde motion can occur, where the angle between vertical and the drops' line of centers decreases as the drops come into contact. This retrograde motion requires alteration to the closed form expression for the collision efficiency. The effect of incompressible surfactant on dilute dispersions of two physical systems is also considered.

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