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The onset of Marangoni convection for evaporating liquids with spherical interfaces and finite boundaries BRENDAN MACDONALD, CHARLES WARD, University of Toronto — We examine the stability of evaporating liquids with spherical interfaces bounded at one value of the polar angle for all azimuthal angles. A linear stability analysis is performed and the results are used to explain why a system with water evaporating from a funnel constructed of PMMA undergoes stable quiescent evaporation but a system with a funnel constructed of stainless steel experiences a transition from a quiescent state to a state with Marangoni convection. We develop the expression for a new stability parameter that provides a quantitative prediction of the transition to Marangoni convection, and find the predictions to be consistent with experiments.

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