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Features of the Interface Equation Coupling Thin and Thick Film Regimes in Conduction-Triggered Thermocapillary Flows ZACHARY NICOLAOU, SANDRA TROIAN, California Institute of Technology, 1200 E California Blvd MC 128-95, Pasadena, CA 91125 — An attractive feature of moving boundary problems involving the coupling of adjacent thin film regimes is the simplified form of the corresponding interface equation. For interfaces subject to conduction-triggered thermocapillary forces and damping by capillary forces, the evolution equation reduces to a 4^{th} order nonlinear PDE. The dispersion equation for linear instability of a uniform state then reduces to Type II, characterized by a vanishing growth rate at k=0, a positive k^2 contribution from the driving force and a negative k^4 from capillary damping. Here we generalize to a moving interface coupling thin and thick film regimes. The resulting 4th order, nonlinear integro-differential equation contains the usual form of the capillary term but a nonlocal thermocapillary term due to far field contributions from the lateral transport of conserved quantities. The dispersion equation in no longer of Type II since the destabilizing term is no longer quadratic. Despite these differences, the generalized form retains certain pleasing features which can be exploited for further analysis.

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