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Optical interference effect on Marangoni instability of irradiated thin liquid films FUMIHIRO SAEKI, SHIGEHISA FUKUI, HIROSHIGE MATSUOKA, Tottori University — The Marangoni instability of thin liquid films on solid substrates induced by irradiative heating is investigated within the framework of the long-wave approximation. The energy transfer that includes the energy absorption and reflection is taken into account. In order to examine the optical interference effects on the instability, focus is placed on a transparent film/absorbable substrate system irradiated by a monochromatic wave with laterally uniform intensity distribution. In such a case, the energy reflectance varies periodically with the film thickness due to optical interference. Numerical simulation results show that the stability of the film depends on the first derivative of the energy reflectance with respect to the film thickness at a reference point, and the resultant surface patterns differ depending on the reference thickness and initial perturbation.

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