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Bow and Oblique Shock Formation in Soap Film ILDOO KIM, SHREYAS MANDRE, AAKASH SANE, Brown University — In recent years, soap films have been exploited primarily to approximate two-dimensional flows while their three-dimensional character is relatively unattended. An example of the three-dimensional character of the flow in a soap film is the observed Marangoni shock wave when the flow speed exceeds the wave speed. In this study, we investigated the formation of bow and oblique shocks in soap films generated by wedges with different deflection angles. When the wedge deflection angle is small and the film flows fast, oblique shocks are observed. When the oblique shock cannot exist, bow shock is formed upstream the wedge. We characterized the oblique shock angle as a function of the wedge deflection angle and the flow speed, and we also present the criteria for transition between bow and oblique Marangoni shocks in soap films.

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