Two Dimensional Models for Bubble Bursts on the Tear Film Surface RICHARD BRAUN, MICHAEL SOSTARECZ, L. PAMELA COOK, University of Delaware — Recent observations of the human tear film surface show bright spots that appear to be bubbles which are present as the eyelid opens. These bubbles move upward on the tear film surface in a concentration gradient. Typically, the bubbles burst and disperse in a process that is strongly suggestive of surfactant spreading in a background flow. Using lubrication theory, we present two-dimensional models both with and without mean surface tension, together with the Marangoni effect for an insoluble surfactant. Solutions are computed numerically using an implementation of the method of lines with finite difference discretizations in space. The models explore the multiple time scales that appear to be present in the tear film.

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