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Wetting dynamics of thin liquid films and drops under Marangoni and centrifugal forces[1] SHOMEEK MUKHOPADHYAY, Chemistry Department, Columbia University, ROBERT BEHRINGER, Physics Department, Duke Univeristy — We present results from ongoing experimental studies on thin liquid drops and thin-films under the combined action of centrifugal forces due to rotation and radial Marangoni forces by using a temperature gradient. For thick rotating film in the absence of a temperature gradient, when an initially thick layer of fluid is spun to angular velocities where the classical Newtonian solution is negative, the fluid never dewets for the case of a completely wetting fluid, but leaves a microscopic uniform wet layer in the center. Similar experiments with a radially inward temperature gradient reveal the evolution of a radial height profile given by h(r) = A(t)r α, where A(t) decays logarithmically with time, and $\alpha = 0.8$. In the case where there is no rotation, small centrally placed drops show novel retraction behavior under a sufficiently strong temperature gradient. This work includes collaboration with Lou Kondic (NJIT), Nebojsa Murisic (UCLA) and Rich Mclaughlin (UNC-Chapel Hill).

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