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Premixed flame propagation and quenching in thin nonadiabatic channels DAVID KESSLER, MARK SHORT, University of Illinois Urbana-Champaign — We investigate the effect of thermal expansion on the burning rate and quenching limits of premixed flames propagating in thin two-dimensional nonadiabatic channels, via the variable density, reacting Navier-Stokes equations. These solutions are compared with numerical and asymptotic results obtained by Daou and Matalon (2002) with a constant density model for a quiescent mixture as well as imposed Poiseuille inflow. The critical heat transfer coefficient necessary to completely quench the flame is determined as a function of channel width and inlet velocity intensity. We also present preliminary examples of flame structures obtained for small Lewis number mixtures.

David Kessler
University of Illinois Urbana-Champaign

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