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Nonlinear stability of a premixed flame subjected to a transverse shear XIAOYI LU, MOSHE MATALON, University of Illinois at Urbana Champaign, CARLOS PANTANO, Unversity of Southern California — We present our findings on the hydrodynamic stability behavior of a premixed flame subjected to a transverse shear. The analysis is first carried out in the weak thermal expansion limit resulting in a modified Michelson-Sivashinsky (MS) equation, which describes the evolution of the flame surface. Numerical solutions to the MS equation show that due to the transverse shear, the flame develops a skewed cusp-like flame, that steadily propagates into the unburned gases and simultaneously translates along the transverse direction. Both propagation and translation velocities are shear-dependent. The fully nonlinear evolution of premixed flames with a realistic density jump at higher shear levels is then investigated using the Direct Numerical Simulations approach.

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