

Abstract Submitted  
for the DFD12 Meeting of  
The American Physical Society

**Flame front as hydrodynamic discontinuity**<sup>1</sup> YASUHIDE FUKU-MOTO, Kyushu University, Japan, SNEZHANA ABARZHI, University of Chicago, Chicago, IL, USA — We applied generalized Rankine-Hugoniot conditions to study the dynamics of unsteady and curved fronts as a hydrodynamic discontinuity. It is shown that the front is unstable and Landau-Darrieus instability develops only if three conditions are satisfied (1) large-scale vorticity is generated in the fluid bulk; (2) energy flux across the front is imbalanced; (3) the energy imbalance is large. The structure of the solution is studied in details. Flows with and without gravity and thermal diffusion are analyzed. Stabilization mechanisms are identified.

<sup>1</sup>NSF 1004330

Snezhana Abarzhi  
University of Chicago, Chicago, IL, USA

Date submitted: 09 Aug 2012

Electronic form version 1.4