1046-76-1824 **Joanna A Bieri*** (joanna@u.northwestern.edu), 909 Elmwood Ave #H2, Evanston, IL 60202.
Dynamics of Edge-Flames in Micro-Channels. Preliminary report.

The dynamics of an edge-flame in a narrow channel is studied within the context of a thermal-diffusive model. Fuel and oxidizer, separated upstream by a thin plate of finite length, flow through a channel with a prescribed velocity. At the end of the plate they mix and, when ignited, an edge-flame is sustained at some distance from the plate. Typically, the flame, which is stabilized by heat conduction back to the cold plate, has a tribrachial structure. It consists of a leading edge made up of lean and rich premixed segments and a diffusion flame trailing behind. The objective of this work is to determine the effect that the channel walls have on the edge standoff distance, on the flame shape and on the flame stability. In particular, we examine the influence of channel width and mixture strength and the effects of differential diffusion. Both the steady and unsteady governing equations are solved numerically using a finite difference second-order approximation in space and an explicit marching procedure in time. We examine boundary conditions ranging from adiabatic to cold isothermal walls. We determine conditions under which the edge-flame is stabilized near the tip of the splitter plate, is held near the tip but oscillates back and forth, or is blown-off. (Received September 16, 2008)