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Flame Structures in Heated Nonpremixed Microburners DAVID KESSLER, Naval Research Laboratory, MARK SHORT, Los Alamos National Laboratory — We investigate the structure and behavior of nonpremixed flames formed in a co-flow of fuel and oxidizer within a submillimeter- scale channel. Two configurations are considered. In the first, the channel walls are held at an elevated constant temperature. A “tuning fork” flame structure is developed that is controlled by the interaction of the thermal boundary layer and the chemical mixing layer. The second configuration allows heat conduction within the channel walls and finite levels of heat loss. Here, external heating is provided at the exit of the channel, and the stability of the tuning fork flame structure in the resulting axial temperature gradient is examined. Increasing levels of heat loss lead to the appearance of oscillating flame structures.

David Kessler
Naval Research Laboratory

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