

5F10: CHARACTERIZATION OF ACOUSTICALLY FORCED SWIRL FLAME DYNAMICS.

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This is an interesting contribution. What was the swirl number in your experiments? Could you tell if this number determines the flame dynamics and what should be ascribed to other factors like for example lateral confinement? In the case of an inverted conical flame, we have shown at the last symposium that the ratio of injector diameter to flame tube diameter had a marked effect on the flame dynamics [1].

Reference:

[1] A.L. Birbaud, D. Durox, S. Ducruix, S. Candel, *Proc. Combust. Inst.* 31 (2007) 1257–1265.

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A 40 degree axial swirler (leading to an approximate swirl number of ~ 0.65) was used to introduce swirl in the flow. The swirl number influences the type and location of the vortex breakdown process [1] that, in turn, influences the flame shape/location and hence its dynamics. Flame dynamics also exhibit sensitivity to confinement; for example, it is well known that expansion ratio (or, more fundamentally, the adverse pressure gradient) influences vortex breakdown boundaries [2]. In addition, confinement also influences the trajectory of the annular jet, as well as the size of the ORZ.

References:

[1] J.H. Faler, S. Leibovich, *Physics of Fluids* 20 (9) (1977) 1385–1400.
[2] A. Revuelta, *Physics of Fluids* 16 (9) (2004) 3495–3498.