

## **PIV Measurements of Centrally Ignited Outwardly Propagating Turbulent Premixed Flames at Reduced and Elevated Pressures**

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This study aims to measure flow statistics of centrally ignited, outwardly propagating flames in a turbulent reactive environment of methane-air mixtures at reduced and elevated pressures using a newly-established high-pressure cruciform burner and PIV. The cruciform burner is composed of two perpendicular cylindrical vessels, equipped with a pair of counter-rotating fans and perforated plates at each end of the horizontal vessel, and placed in the interior of a large pressure-absorbing safety chamber. The burner is capable of generating intense isotropic turbulence, where the fan frequencies can be up to 180 Hz. The vertical vessel of the cruciform burner has four sensitive pressure-release valves installed symmetrically, so that the pressure increment inside the burner during explosion can be neglected due to the relative large volume of the safety chamber. Two sets of four quartz windows are installed on each of both inner and outer chambers allowing direct visualizations and optical measurements of flame-turbulence interactions in two perpendicular directions. Preliminary PIV results will be presented, in which variations of spatiotemporal scales due to flame-turbulence interactions will be discussed and area for further studies will be identified.

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