

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)  
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EXPERIMENTAL INVESTIGATION ON EXTINCTION OF PREMIXED TURBULENT  
COMBUSTION IN OPPOSED FLOW**Abstract**

This work successfully built a new experimental system that is suited for premixed turbulence flame in microgravity and able to work on the ground or the microgravity falling tower in National Microgravity Laboratory, Chinese Academy of Sciences (NMLC). The system can control the flow rate and turbulence intensity accurately, in order to research the extinction of premixed turbulent. To provide a fundamental fluid mechanical and extinction background for broader study turbulent combustion, experimental work measure the nonreacting flow field and conduct the experimental research of methane/air mixtures combustion in opposed streams. Since the flows upstream of the flame zones has the same form of velocity field as nonreacting opposed flow, the aim to text the flow field of nonreacting field is provide the referenced fluid mechanism for combustion experiment. Under certain conditions the flame can be forced to extinction and this limit is studied for lean methane/air mixtures with different turbulent stretch rate, different reaction mixture composition and different CO<sub>2</sub>-diluted concentration. The result will be compared to previous work and verify the turbulent flame limit model:  $K=0.157(u'/SL)^2 ReT^{-0.5}$ .

Ground experimental work will be compared with microgravity experimental results that are conduct in falling tower, so we can thoroughly understand flammability limits mechanism without the buoyancy.