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### Experimental investigation of multichannel plasma igniter in

#### a supersonic model combustor

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#### Abstract

Reliable and fast ignition of scramjet engine is quite important in consideration of high velocity and low pressure of inlet air. Successful ignition requires that sufficient ignition energy be injected into the flame kernel so that the flame propagates outwardly beyond the critical initial radius of the critical flame. Larger critical flame initiation radius is required during the preliminary stage of scramjet engine so advanced ignition technology for scramjet engines is urgently needed. In this study, multichannel plasma igniter (MCPI) is proposed to induce a relatively larger ignition kernel for the purpose of achieving successful ignition in scramjet engines. Ignition experiments in a model scramjet combustor fueled by ethylene were conducted with inflow conditions of Ma=2.52, stagnation pressure  $P_0=1.6$  MPa and stagnation temperature  $T_0=1600$ K. Ignition processes of SI and MCPI at different fuel injection schemes were captured by CH\* chemiluminescence imaging and flame

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