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带支板超燃冲压发动机燃烧流动过程试验研究(PDF)

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Title: Combustion Tests of a Scramjet Combustor with a Strut

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关键词: [超燃冲压发动机](#); [支板](#); [激波](#); [点火](#); [燃烧流动过程](#)

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摘要: 利用高速摄影对激波诱导点火及流场内部的燃烧流动过程进行了观测, 对不同时刻的流场火焰分布进行了比较分析, 结果表明:支板和斜坡所产生的激波能够诱导氢气自燃, 增强局部的燃烧效率, 当其持续存在时, 还可稳定氢气的燃烧。诱导氢气与煤油共同燃烧时, 燃烧室内发生了热力壅塞, 此时煤油的穿透度大幅度提高, 火焰分布范围更广, 稳定火焰的难度降低, 支板与斜坡所引起的阻力也随之减小。

Abstract: Experimental studies on the combustion and flow process in a scramjet combustor with a strut were presented, and much attention was paid on the flame distribution of the flow field. The results show that the shock induced by strut and ramp in the scramjet combustor could promote both the autoignition and local combustion efficiency of hydrogen. Continuously existing shock could also promote the stable reaction of hydrogen and air. When the fuel ratio is high, thermal choke occurs in the combustor. Then it will be easy to hold the flame, the distribution zone of which expands due to the improved penetrability of kerosene, and consequently the drag caused by the strut and ramp decreases.

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