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### 钝缘舵高超音速湍流分离特性

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### TURBULENT SEPARATION FEATURES INDUCED BY BLUNT FIN IN HYPERSONIC FLOW

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摘要

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**摘要** 给出由半圆柱前缘舵诱导的高超音速湍流分离的实验结果。实验气流  $Ma$  数为 7.8, 单位长度  $Re$  数为  $3.5 \times 10^7 m^{-1}$ 。结果表明: 钝缘舵诱导的湍流分离极不稳定, 分离激波出现大尺度低频振荡, 使壁面压力和热流率无量纲标准偏差在主分离线附近达最大值。  $Ma$  数愈高, 最大无量纲标准偏差值越大。在前缘区前缘直径是控制分离流场尺度和平均壁面压力、热流率分布的主要参数

**关键词:** 高超音速流分离流相互作用 空气动力学 钝前缘 压力测量 热通量

**Abstract:** This paper presents the turbulent separation features induced by blunt fins with a semicylindrical leading edge in the hypersonic flow. The nominal test conditions were freestream Mach number of 7.8 and unit Reynolds number of  $3.5 \times 10^7 m^{-1}$ . The results show that turbulent separation induced by blunt fins is unsteady and separation shock undergoes large scale low frequency motion. There are maximum values of standard deviations of wall pressure and heat transfer fluctuations normalized by the local mean level near the primary separation line. The maximum values are found to increase with the freestream Mach number. The leading edge diameter is a dominant parameter controlling the separation field scale and distribution shape of mean wall pressure and heat transfer in the leading edge region.

**Keywords:** hyper sonic flow sepa rated flow interactional aerodynamics blunt leading edges pressure measurement heat flux

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