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A STUDY ON THE AERODYNAMIC INTERFERENCE AND THE IMPROVEMENT OF  
PROTUBERANCES OF THE FIRST CHINESE COMMERCIAL LIQUID LAUNCHER “ZQ-2”

**Abstract**

AbstractZhuQue-2 (ZQ-2), the first Chinese, or even the first world's commercial liquid Oxygen-Methane (LOX/LCH<sub>4</sub>) launch vehicle, and its LOX/LCH<sub>4</sub> liquid rocket engine named “TQ” series, are both developed by LandSpace Technology Corporation Ltd. ZQ-2, aiming to launch low earth orbit satellites, is a two-stage launch vehicle with 4 fins fixed on the rear part of the first stage to improve stability in the transonic Mach regime. The Length of ZQ-2 is nearly 50m and its diameter is 3.35m. Aerodynamic characteristics analysis shows that at small angle of attack, the variation of pressure center coefficient can reach 20

Key words Commercial Launcher; First Chinese LOX/LCH<sub>4</sub> launcher; liquid launch vehicle; small angle of attack; Pressure center; Protuberances; Aerodynamic interference; Wind tunnel test