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AEROTHERMODYNAMIC EXPERIMENT AND SIMULATION OF SPATIAL EFFECTS IN A
DIVERT THRUST CHAMBER IN HYPERSONIC FLOW

Abstract

Aerodynamic heating, that a thrust chamber which uses regenerative cooling technology will suffer from, is produced in hypersonic flows. The propellant in the cooling jacket will be heated. The problem of aerodynamic heating for thrust chamber without working is analyzed by wind tunnel test and numerical simulation in this paper. Detailed analysis of the distribution of the dangers points shows the influence of three-dimensional effect. After conducting the simulation of the aerodynamic heat transfer of the divert thrust chamber on the missile, it makes a distinction with two-dimensional situation that the dangers points don't appear on the symmetry plane, but has an excursion with a little angle. To give a reference for analyzing, the condition of the aerodynamic heat transfer of the complex cavity such as the thrust chamber in hypersonic flow is shown. The environmental adaptability of the thrust chamber used regenerative cooling technology are improved.