

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Near-Earth and Interplanetary Communications (5)

Author: Ms. runhui WU

China Academy of Launch Vehicles Technology, China, rhonda20120322@sohu.com

Prof.Dr. shengjun zhang

China Academy of Launch Vehicle Technology(CALT), China, zhangsj98@sina.com.cn

THE PROPAGATION CHARACTERISTIC OF THE QPSK SIGNALS IN REENTRY PLASMAS

Abstract

A spacecraft entering the Earth's atmosphere is enveloped by a plasma layer or sheath due to shock heating of the surrounding air and ablation of the heat shield material, and the plasma sheath may strongly effect the communication between the vehicles and receiver systems. In order to obtain the influence of communication system which is produced by reentry plasmas, a mechanism of QPSK signals through reentry plasmas which surround vehicles travelling at hypersonic velocities is proposed in this paper, and the simulation model of the QPSK signals propagation in plasma sheath is described. Then the energy attenuation and phase variable of QPSK signals which are transmitted by reentry plasmas are computed. The analysis results are shown that the QPSK signals would be shielded thoroughly if the plasma frequency is bigger than carrier frequency, and when the QPSK signals can propagate in reentry plasmas, the bit error probability (BEP) of communication systems would be improved by reentry plasmas which are ability to absorb the signals energy and vary signals phase. The simulation and analysis technique can also be used to calculate many other communication models such as FSK and ASK.