

地球物理学报 » 2010, Vol. 53 » Issue (11) : 2544-2550

空间物理学★大气物理学★大地测量学

最新目录 | 下期目录 | 过刊浏览 | 高级检索

引用本文:

卢斌, 陈出新.木星极光区亮斑形成机制[J] 地球物理学报, 2010,V53(11): 2544-2550,DOI: 10.3969/j.issn.0001-5733.2010.11.002

LU Bin, CHEN Chu-Xin.The causation of bright spots polarward of Jupiter's aurora oval.Chinese J.Geophys. 2550,DOI: 10.3969/j.issn.0001-5733.2010.11.002

## 木星极光区亮斑形成机制

卢斌, 陈出新\*

中国科学院基础等离子体重点实验室 中国科学技术大学地球和空间科学学院,合肥 230026

The causation of bright spots polarward of Jupiter's aurora oval

LU Bin, CHEN Chu-Xin\*

CAS Key Laboratory of Basic Plasma Physics, School of Earth and Space Sciences, University of Science & Technology of China

摘要

参考文献

相关文章

Download: [PDF \(972KB\)](#) [HTML 1KB](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

摘要 近年来一系列的木星照片显示,除了主极光卵和卫星足迹外,在极光卵内还有极区发射.学者基本认为这是由中磁尾的磁重联引起的.本文建立一个具有离心力效应的木星稳态磁场模型.并以该模型给出的磁场结果为基础,利用Hill等人1979年总结的木星磁层的结果进行模拟分析.结果显示在约 $54R_J$  ( $R_J$ 为木星平均半径)至 $60R_J$ 的木星磁场由于较差自转形成涡旋结构,其形状约为木星半径.由于磁力线的扭曲引发大小为数十万安培的电流注入极区电离层,与中性粒子相互作用,从而形成极光卵内的亮斑.

关键词: 木星 磁层 极区发射 较差自转 回流电流

Abstract: An extended series of images have shown that, besides the main aurora oval and satellite footprint there is polar emission in the aurora oval, which is believed by some scholars that it results from the reconnection in the middle magnetotail. This paper aims to construct a self-consistent stationary model of the Jupiter's magnetosphere include the centrifugal force, and make analysis of numerical simulation based on the results of the magnetic field and the differential rotation theory of Hill in 1979. It is shown that because of the differential rotation, the middle magnetotail (about  $54R_J$  to  $60R_J$ ) forms a shape of volution, which looks like a round Jupiter's radius. It generates a current about  $2.9 \times 10^5$  A return to the polar ionosphere, and a bright spot in the auroral oval has been observed.

Keywords: Jupiter Magnetosphere Polar emission Differential rotation Return current

Received 2010-09-29;

Fund:

中国科学院重点方向项目(KZCX2-EW-QN501, KJCX2-YW-T13-3)和国家自然科学基金项目(41074118,40890163)资助