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电离层Alfven谐振反馈不稳定性研究

石润[1,2]*

1. 中国极地研究中心国家海洋局极地科学重点实验室,上海 200136;
2. 复旦大学物理系,上海 200433

Study of the ionospheric Alfven resonant feed back instability

SHI Run[1,2]*

1. State Oceanic Administration Key Laboratory for Polar Science, Polar Research Institute of China, Shanghai 200136, China;
2. Department of Physics, Fudan University, Shanghai 200433, China

摘要 本文利用分层(磁层、电离层、大气层)模型,分析了电离层电导率以及磁场方向对电离层Alfven谐振(简称IAR)反馈不稳定性的影响.结果表明:倾斜磁场可以有效改变IAR的参数(谐振频率与增长率),进而改变IAR反馈不稳定性的性能,磁场方向向上时,在电离层电导率较大且不考虑Hall电导率的情况下,磁场倾斜角的减小有利于电离层不稳定性的形成,电离层Hall电导率可以增大IAR反馈不稳定性的增长率,且对于较大的倾角增长率提升较大.

关键词 分层模型, 电离层Alfven谐振反馈不稳定性, 倾角

Abstract: The layered model (magnetosphere, ionosphere and atmosphere) is used to analyze the influence of ionospheric conductivity and dip angle of the magnetic field on the Ionospheric Alfven Resonant (IAR) feedback instability. The results of the numerical calculation show that the dip angle effectively modifies the parameters (resonant frequencies and the growth rate) of the IAR, which consequently influence the IAR feedback instability; for the upward magnetic field, the decreasing of dip angle is propitious to the formation of the instability for large Pederson conductivity when ignoring the Hall conductance; the consideration of Hall conductance can increase the growth rate, especially for greater dip angle.

Keywords Layered model, Ionospheric Alfven resonant instability, Dip angle

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About author: 石润,男,1983年生,博士,从事电离层Alfven波的研究.E-mail:shirun@pric.gov.cn

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