Pickup Ion Instabilities and IBEX Energetic Neutral Atom Ribbon

时间：7月3日（周三） 上午10:00

地点：九章大厦 A709室

报告人：刘凯军

个人简介：南方科技大学地球与空间科学系教授，系副主任。1999年毕业于北京大学空间物理学专业，获学士学位；2002年在北京大学获硕士学位；2007年在美国康奈尔大学获理学博士学位。其后分别在芬兰气象研究所和美国洛斯阿拉莫斯国家实验室从事博士后研究，并于2012年获聘为美国奥本大学物理系助理教授，后于2017年晋升为终身副教授。2018年夏回国工作，入职南方科技大学。一直从事空间等离子体物理方面的研究，发表论文近50篇。其研究专长是等离子体动力学理论和计算机模拟，当前主要研究方向为地球辐射带中等离子体动力学不稳定性和与之相关的波的激发与粒子散射。

报告摘要：

报告内容：

Linear analysis as well as hybrid and quasi-linear simulations are performed to examine the stability of pickup ions in the outer heliosheath. This is critical for the validity of the secondary energetic neutral atom (ENA) mechanism, a promising model for the enigmatic ENA ribbon observed by the Interstellar Boundary Explorer (IBEX). In the secondary ENA model, pickup ions in the outer helioshealth need to remain stable for years but their ring-like velocity distribution is liable to several plasma instabilities, including the Alfvén cyclotron, mirror, and ion Bernstein instabilities. The present study evaluates how the Alfvén cyclotron instability growth can quickly scatter the pickup ions. The contributions of the mirror and ion Bernstein instabilities are also explored. Although recent studies showed that a pickup ion velocity ring can remain stable to the Alfvén cyclotron instability when the parallel thermal spread of the pickup ions is comparable to that of the background ions, the other two instabilities are still unstable. Their growth leads to parallel heating of the pickup ions and the heated pickup ions can subsequently trigger the Alfvén cyclotron instability. So the pickup ion stability is still a challenge for the second ENA mechanism.