

1. The effects of spacecraft charging and outgassing on the LADEE ion measurements

2. A new mechanism for the field line twisting in the ionospheric magnetic flux rope



时间：7月3日（周三） 上午09:00

地点：九章大厦 A709室

报告人：谢良海

**个人简介：**澳门科技大学月球与行星科学国家重点实验室助理教授。2009年毕业于中南大学应用物理学专业，获学士学位；2014年在中国科学院国家空间科学中心获空间物理学博士学位。其后在空间中心担任助理研究员，并于2015年在澳门科技大学太空科学研究所从事博士后研究。2016年在美国加州大学洛杉矶分校行星和系外行星研究所做访问学者。2017年至今担任澳门科技大学月球与行星科学国家重点实验室助理教授。主要研究领域为空间等离子体数值模拟，和月球与行星空间环境研究。

### 报告摘要：

Abnormal ion signals can be usually seen in the Lunar Atmosphere and Dust Environment Explorer (LADEE) mission, including a suddenly enhanced current observed by the Lunar Dust Experiment (LDEX) near the sunlight-shadow boundary and an unexpected water ion measured by the neutral mass spectrometer (NMS), with their magnitudes insensitive to the convection electric field of solar wind but dependent on the SW density and the elapsed time of LADEE mission. By analyzing both the LDEX measurements and the NMS measurements, we find that the current enhancement can be caused by a negatively charged spacecraft in the shadow region while the significant  $\text{H}_2\text{O}^+$  ions should be some artificial ions from spacecraft outgassing.

Magnetic flux ropes (MFRs) with twisted magnetic field lines are common in the solar system, most of which can be caused by magnetic reconnection or velocity shear. However, these two mechanisms have difficulties in explaining the formation of MFRs observed in the planetary ionosphere. Here we find that a dynamo process can be caused by the differential compression at different parts of a flux tube when it is sinking into the partially ionized ionosphere, leading to an increase in the magnetic energy. The differential compression also produces an azimuthal component of  $\nabla \times \vec{E}$ , which generates azimuthal magnetic fields with twisted magnetic field lines and gives rise to an ionospheric MFR..