



SEMINAR 專題演講



國立中央大學 太空科學與工程學系

Department of Space Science and Engineering, National Central University

Time

Thursday, August 01,
2024
15:00 – 16:00

ARTEMIS Observations of Lunar Pickup Ions: Insights into Properties and Dynamics of the Exosphere

Place

健雄館(科四館)

S4-811 教室
Room S4-811,
Chien-Shiung Building

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The lack of a global magnetosphere at the Moon allows for direct interaction between the solar wind and the lunar exosphere. Once exospheric neutrals are ionized by photons, protons, or electrons from the Sun, the resulting ions are accelerated away from their source locations by the motional electric field of the solar wind. These ions, known as pickup ions, are frequently observed by the two Acceleration, Reconnection, Turbulence, and Electrodynamics of Moon's Interaction with the Sun (ARTEMIS) spacecraft. We identified a rich array of pickup ion observations, determined their characteristics, and traced their source locations using analytical ion-trajectory calculations. This presentation will delve into the results derived from statistically analyzing the observed characteristics and inferred source locations of pickup ions. These results offer insights into exospheric dynamics and properties such as constraints on exospheric species, the role of sputtering in generating exospheric neutrals, the altitude profile of the exosphere, and the effects of crustal magnetic anomalies. Furthermore, the pickup process of exospheric ions by the solar wind prevents the formation of a steady and dense lunar ionosphere. A comprehensive investigation into ARTEMIS density measurements near the lunar surface spanning a decade will also be presented, illustrating limits on the plasma density of the lunar ionosphere.