

R009-19

Zoom meeting D : 11/1 PM2 (15:45-18:15)

16:00~16:15

Oxygen ion modulation by magnetosonic waves in the upper ionosphere of Mars

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It is critically important to characterize the transport of energy and mass in the near-Mars space if we are to understand the current and past ion escape from Mars driven by the solar wind interaction with the Martian upper atmosphere. Among possible ion energization processes, it has been suggested that magnetosonic waves generated upstream of the Martian bow shock propagate through the magnetosheath into the upper ionosphere of Mars, heat oxygen ions of ionospheric origin via wave-particle interactions, and facilitate ion escape to space. However, mechanisms of energy transfer from the magnetosonic waves to oxygen ions remain elusive. In this study, we investigate the interaction between magnetosonic waves and oxygen ions by analyzing ion velocity distribution functions and time-varying magnetic fields measured by MAVEN. We identified a number of cases in which the oxygen ion velocity is modulated by magnetosonic waves around the local oxygen ion cyclotron frequency. Based on case studies and statistical results, we explore mechanisms of wave-particle interactions capable of explaining the observed properties.