



國立中央大學太空科學與工程學系
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專題演講

Do “hidden heavy ions” play an important role in the polar wind study?

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(University of Illinois, Urbana-Champaign, USA)

Time : 109 年 12 月 28 日 星期一 15:00-16:00

Place : 健雄館(科四館) S4-811 教室

摘要/Abstract :

The source of magnetospheric H⁺ are both the solar wind the ionosphere, while the low charge state heavy ions, including N⁺, O⁺, N₂⁺, NO⁺ and O₂⁺, can only come from the ionosphere. Albeit limited, several observations show the importance of ionospheric N⁺ and molecular ions, including NO⁺, N₂⁺ and O₂⁺, in the high-altitude ionosphere and magnetosphere, opening up the question of the composition of ion outflow. However, the mechanisms responsible for accelerating the ionospheric heavy ions from eV to keV energies are still largely unknown. Developed from the Polar Wind Outflow Model (PWOM), the Seven Ion Polar Wind Outflow Model (7iPWOM) solves the gyrotropic transport equations for all the relevant ion species (e⁻, H⁺, He⁺, N⁺, O⁺, N₂⁺, NO⁺ and O₂⁺) along open magnetic field lines. Numerical simulation results from the 7iPWOM suggest that the N⁺ ions play a key role in the polar wind solution both in the hydrodynamic and kinetic solutions. In addition, the relative abundance of molecular ions, and how they change the polar wind solution, will reveal the link between lower thermosphere and the ionosphere. Therefore, tracking the molecular ions helps understand how the “fast ion outflow” acquires sufficient energy in such a short time scale compared with the dissociative recombination lifetime of the molecular ions and assess the role of molecular ions in the overall dynamics of the polar wind outflow.

※歡迎聽講※

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