Imaging of escaping Oxygen ions from Mars and Venus

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Unmagnetized planets such as Mars and Venus have different atmospheric escaping process from the magnetized planet like earth. It will be very useful if we can make a imagery of such outflowing Oxygen ions. We have been developing extreme ultra-violet scanner to detect resonantly scattered solar EUV emission by Helium ions and Oxygen ions. We will present the calculation result of g-factor of Oxygen ions and will discuss the observation condition based on the Oxygen ion escape model at Mars and Venus.

Unmagnetized planets such as Mars and Venus have different atmospheric escaping process from the magnetized planet like earth. Phobos 2 spacecraft found a dense Oxygen ion beam in the plasma tail of Mars. As is well know, the escaping rate of such Oxygen ions will evacuate Martian atmosphere which consists mainly of CO2 only in 100 Myears. Feature planetary missions will have its main target in revealing such escaping process, and it will be very useful if we can make a imagery of such outflowing Oxygen ions.

We have been developing extreme ultra-violet scanner to detect resonantly scattered solar EUV emission by Helium ions and Oxygen ions. Oxygen ions escaping from Mars and Venus scatter EUV emission near 83.4nm. This resonance line is a triplet and the emission lines from solar O+ and O++ are ninthlet. Under such a condition the Oxygen ions moving relatively toward /away from the sun make a resonance scattering with different resonance line after Doppler shift. The g-factor is a function of the bulk speed and the temperature of the Oxygen ion. The calculation shows that the Oxygen ions moving away from the sun with several hundreds km/s speed can scatter enough solar EUV emission for imagery.

We will present the calculation result of g-factor of Oxygen ions and will discuss the observation condition based on the Oxygen ion escape model at Mars and Venus.