Study of Effects on Field-aligned Motion of Picked up Ions due to Interaction with Solar Wind.

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Acceleration process of cometary picked up ions have been studied for the case of the ion trap processes in the coma regions of Halley comet. In this region, the ion beams are generated due to the ionization of the cometary neutral gases in the frame of the solar wind plasma. We assumed cometary oxygen ions whose initial beam velocity is equal to the solar wind velocity, 10 Va (Va is alfven velocity).

Based on an analysis of linear wave-particle interaction and a hybrid code computer simulation, ion beam instabilities caused by parallel velocity component of cometary beam ions generates large amplitude MHD waves with wave length 140 Va/Wp, where Va is alfven velocity and Wp is proton cyclotron frequency.

Maximum values of the fluctuating magnetic field obtained from simulations was 0.4 B0 in 120 Wp^-1 (B0 is initial magnetic field intensity).

A hybrid code computer simulation revealed that the field-aligned motion of cometary ions has been found to be deeply influenced by large amplitude MHD waves excited by ion beam instabilities.