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Observations of Lunar Wake Boundary (LWB) Oscillation by CE-1 spacecraft

Chang'E-1 is a lunar orbiter, which was successfully launched on October 24, 2007 and inserted into lunar orbit on November 5, 2007. Chang'E-1(CE-1) is operated in the circular orbit around the moon with an altitude about 200 km, and the inclination of the orbit is about 90 degrees. The spacecraft is 3-axis stabilized and the –Z axis of the spacecraft points to the moon surface to image the moon. An ion analyzer package is installed on the lunar orbiter, Chang'E-1, to monitor the space plasma density and ion energy spectrum variations near the lunar orbit. The moon moves around earth and crosses some space environmental boundaries around the earth, such as, bow shock, magnetosheath, magnetotail, and unshocked solar wind, and the plasma ion analyzer orbiting the moon would be a good tool to investigate the interactions between solar wind plasma and un-magnetized moon body, specially for the lunar wake structure and dynamic processes in this wake region. The ion analyzer observed the wake boundary wavy phenomenon from the ion flux oscillations when the spacecraft crossed the wake boundary behind the moon. The ion energy is increased slightly in the wavy boundary, and that is possibly accelerated by the bi-polar electric field across the wake