

SPACE EXPLORATION SYMPOSIUM (A3)  
Moon Exploration – Poster session (2D)

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BAO/CAS, ChinaCHANG'E-2 OBSERVATION OF INTENSIVE  $4\text{He}^+$  FLUX PICKED-UP BY SOLAR WIND IN  
DAYSIDE LUNAR EXOSPHERE**Abstract**

On November 6, 2010, an M class solar flare was exploded on the Sun and the corona mass ejection event associated with the M flare reached the moon two days later. Chang'E-2(CE-2) spacecraft operated on the polar circular orbit, with altitude of 100km above the lunar surface. Solar Wind Ion Detector (SWID) on CE-2 observed intensive  $4\text{He}^+$  flux when SWID oriented to the sun.  $4\text{He}^+$  flux was identified from the energy spectrum of SWID by comparing with solar wind proton and alpha particles' energy spectrum. We analyzed the ion flux energy spectrum and found that the peak flux energy/q of solar wind proton was about 430eV, and solar wind alpha particle peak flux energy/q was about 852eV. Two peaks were presented in the higher energy band for the CME event on November 8, one was 1687eV, and the other was 3198eV. We suggested that the 1687eV peak distribution was corresponding to  $4\text{He}^+$  flux. The intense alpha particles flux associated with the M class solar flare bombarded lunar surface and sputtered out the Helium atoms trapped by lunar regolith. The intense sputtering of Hydrogen atoms from lunar regolith has been reported by Wieser et al.[2010]. The neutral Helium atoms escape away from moon and are ionized by solar UV radiation. The newly ionized  $4\text{He}^+$  ion was picked-up, and accelerated by solar wind to the solar wind velocity. The picked-up  $4\text{He}^+$  ions running with the solar wind velocity have 4 times energy/q comparing to the solar wind protons.