

ROSAT Observations of Solar Wind Charge Exchange with the Lunar Exosphere

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We analyze the ROSAT PSPC soft X-ray image of the Moon taken on 29 June 1990 by examining the radial profile of the count rate in three wedges, two wedges (one north and one south) 13-32 degrees off (19 degrees wide) the terminator towards the dark side and one wedge 38 degrees wide centered on the anti-solar direction. The radial profiles of both the north and the south wedges show substantial limb brightening that is absent in the 38 degree wide antisolar wedge. An analysis of the count rate increase associated with the limb brightening shows that its magnitude is consistent with that expected due to solar wind charge exchange (SWCX) with the tenuous lunar atmosphere. Along with Mars, Venus, and Earth, the Moon represents another solar system body at which solar wind charge exchange has been observed. This technique can be used to explore the solar wind-lunar interaction.