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Study on cusp/cleft O+ transport path inside the magnetosphere
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Univeristy of New Hampshire — The plasma in the magnetosphere comes from both
the solar wind and the ionosphere. Energy from the solar wind can heat and acceler-
ate the ionospheric ions, causing them to flow out from the cusp and be transported
across the polar cap, into the magnetotail. The polar orbit of the CLUSTER satel-
lite is ideal for observing the transport path. Using the instrument CODIF/CIS,
which measures ion composition from 40 eV to 40 keV, these ions can be identified
as tailward streaming O+, with a narrow energy range. We have developed an au-
tomated procedure to identify this population. The database gives the occurrence
frequency of the streaming O+ as a function of position for geomagnetically quiet
and storm times and how it depends on IMF magnitude and orientation, solar wind
pressure, and geomagnetic activity. We find that while the beams can be observed
for all geomagntic conditions, their occurrence frequency is much higher during ge-
omagnetic storms. In addition. we find that there is a strong asymmetry in the
transport that depends on the y-component of the interplanetary magnetic field.

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