

Proton entry into the plasma void formed downstream of an insulating, non-magnetized obstacle in the solar wind

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The proton entry into the plasma void formed downstream of an insulating, non-magnetized obstacle in the supersonic flow of the solar wind is studied by using a two-dimensional, electromagnetic particle-in-cell simulation. The protons are accelerated by the negative electric potential in the plasma wake, and the size of the proton void is much smaller than that estimated from the ratio of the solar wind bulk speed to the proton thermal speed. In the slow solar wind, the proton void shrinks because the protons are well accelerated within a short distance past the obstacle, due to the long time required to pass through the intense electric field near the wake boundary.

Keywords: moon, near moon wake, proton acceleration, solar wind, PIC simulation, electric potential