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# Impact of multiply charged heavy solar wind ions on the surface of Mercury and the Moon

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Mercury is a planet with a relatively weak intrinsic magnetic field without an atmosphere. The Moon, instead, has neither an atmosphere nor a global intrinsic magnetic field. The surface of these objects are therefore anticipated to be subject to impacting solar wind ions, protons, alpha particles and multiply charged heavy ions such as O6+ and O7+ ions. Impacting ions are a manifestation of direct plasma-surface interaction at Mercury and it has many consequences to the near Mercury space. Especially, impacting ions kick off neutrals and ions from the surface, thus affecting Hermean exosphere and its magnetospheric plasma. The impact on solar wind protons have recently been studied self-consistently by a quasi-neutral model [Kallio and Janhunen, GRL 2003]. However, effects of impacting multiply charged solar wind ions at Mercury have not yet received much attention. For example, it has been emphasized that impacting multiply charged solar wind ions result in soft-X ray emission, that they can effectively ionize and dissociate the molecular structure of a surface, and that these ions may result in a more effective surface sputtering that impacting solar wind protons [D. E. Shemansky, AIP Conf. Proc. 663, 2003]. In the presentation we (1) Use a quasi-neutral hybrid model to calculate the flux of impacting solar wind alpha particles (He++) and O7+ ions on the surface of Mercury and the Moon, and (2) Discuss various consequences of the impact, especially on soft X-ray emission and surface sputtering.