

# The Hermean surface-exosphere-magnetosphere system and its interaction

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Mercury's surface releases Na, O, H, He, K, Ca and possibly other components by thermal desorption, photon-stimulated desorption, micrometeoroid impacts, and sputtering, forming an extended tenuous atmosphere (exosphere). The exosphere of Mercury is subject to ionization such as photoionization, and the ionized gases circulate along the convection of the magnetosphere and then can partially reenter the Hermean surface-exosphere system to further sputter the surface material. These facts indicate that the Hermean surface, exosphere, and magnetosphere are not sole systems but strongly interact with each other. The understanding of the Hermean surface-exosphere-magnetosphere system and its interaction processes is one of the important targets of the BepiColombo mission.

We will show results of a global simulation of Mercury's exosphere-magnetosphere system and discuss implications for its interaction with the surface system. Our simulation model self-consistently includes the exoionosphere of Mercury, which enables us to discuss unresolved issues such as how dense the exoionosphere is, how much conductivity the exoionosphere provides to close FACs, and what are the impacts on the magnetospheric dynamics.