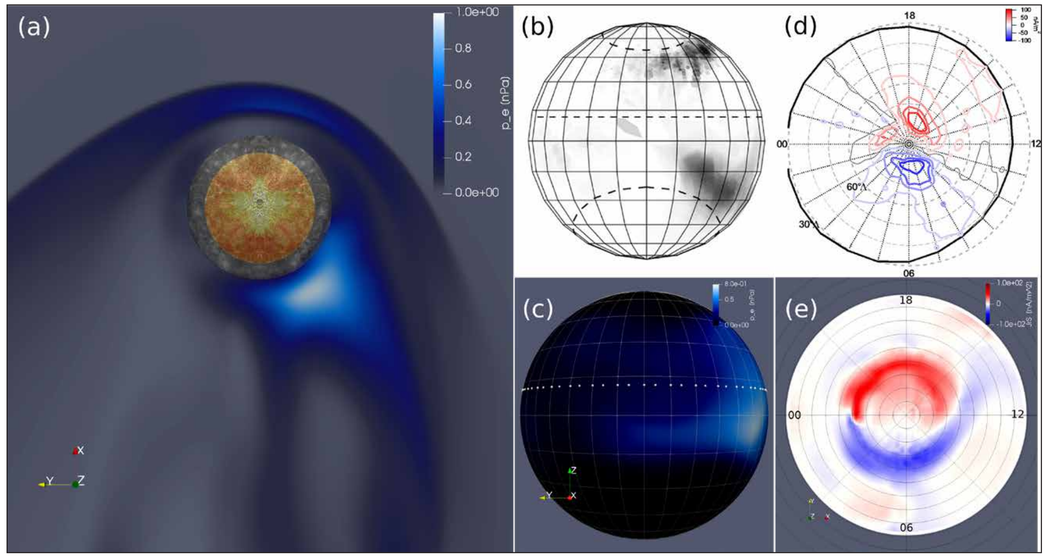
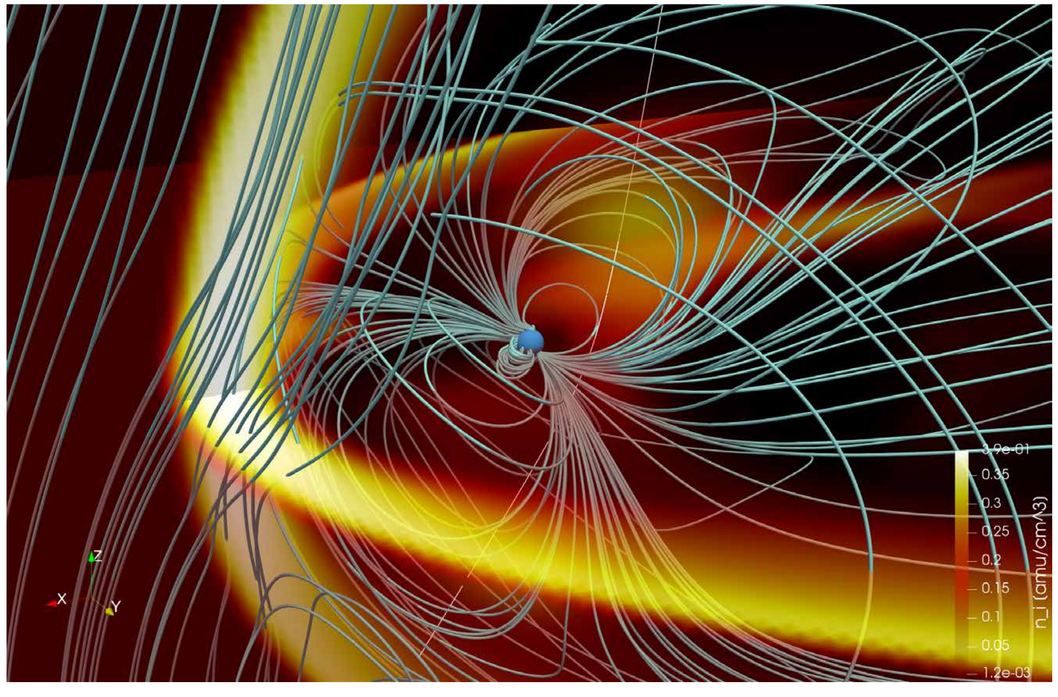


Comparision of simulation data with MESSENGER observations. (a) Electron pressure distribution in Mercury's magnetic equatorial plane. (b) MESSENGER X-Ray Spectrometer observations of energetic electron-induced surface fluorescence at Mercury's nightside surface. (c) Electron pressure distribution at nightside surface from the ten-moment model. (d) Contour plot of radial current density at Mercury's northern hemisphere surface vs. local time in hours based on MESSENGER observations. (e) Calculated radial current density at Mercury's northern hemisphere surface from the ten-moment model. *Chuanfei Dong, Liang Wang, Princeton University,*



Perspective view of the Uranian magnetosphere from a ten-moment multifluid simulation. The solar wind impinges from the left side and carries interplanetary magnetic field lines. The green streamlines are magnetic field lines. Note that Uranus has highly tilted intrinsic magnetic fields that are different from Mercury and Earth. The yellow-scale contours represent the ion number density in unit per cubic centimeter (cm^{-3}). The sharp boundary in ion density at the dayside (left side) marks the bow shock due to the fast-moving solar wind flow. *Chuanfei Dong, Liang Wang, Princeton University*

National Aeronautics and
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How Does Space Weather Affect Mercury, Earth, and Uranus?

Space weather can have devastating effects on human health and technology. Improving our understanding of its impact on Earth can potentially lead to the mitigation of space weather damage through forecasting. Moreover, investigating the solar wind's interactions with other planets will enhance the science returns of NASA's missions such as MESSENGER to Mercury, the Magnetospheric Multiscale around Earth, and the Voyager flyby past Uranus.

For the first time, we studied the solar wind interaction with Mercury, Earth, and Uranus by employing a global ten-moment multifluid model. NASA's HPC resources make it possible to perform these 3D magnetospheric simulations and study the responses of different planets to varying space weather conditions.

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