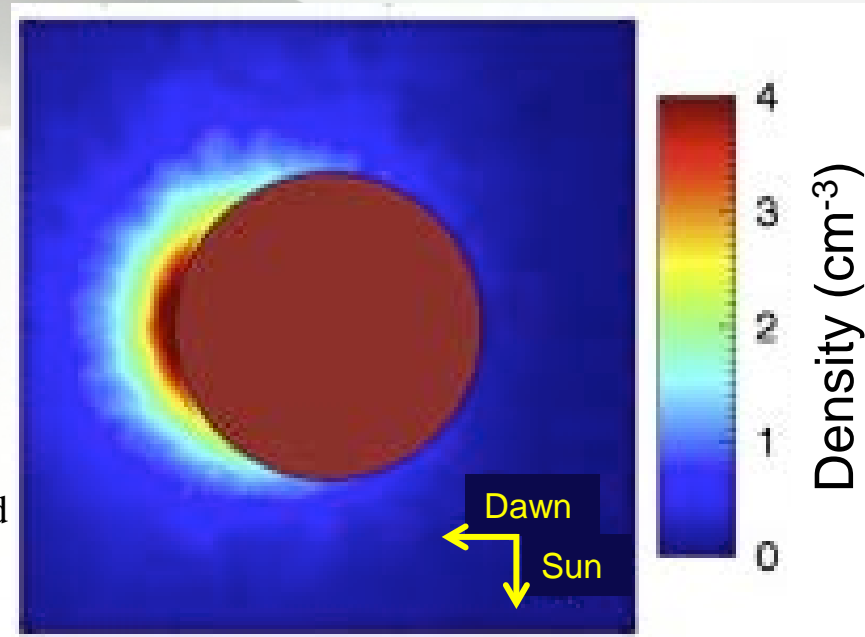


MESSENGER Detects Seasonal Variation of Mercury's Exosphere

The MESSENGER spacecraft has made observations of the dayside of Mercury to seek out the source of the calcium observed in the atmosphere.

- The exosphere of Mercury is primarily composed of compounds derived from the regolith, interplanetary dust, and the solar wind. In particular, the element calcium was measured in the atmosphere from previous Earth-based observations of Mercury. Although the mechanism for its production was unclear, it did not seem to be from either magnetospheric effects or material that had been deposited on the night side and released into the atmosphere as it rotated into sunlight – the way that many components of the Moon's atmosphere are produced.
- Using MESSENGER data, scientists created a model of Mercury's exosphere and identified that there is a persistent source of calcium supplied from the equatorial part of the planet near the dawn terminator. Additionally, these data indicates that there is a seasonal dependence to the dawn source of Mercury's dayside exospheric calcium, and no obvious year-to-year variations in the near-surface dayside calcium exosphere.
- Although the model was unable to identify the specific mechanism responsible for ejecting calcium from the surface, the new observations of the behavior of calcium in the atmosphere indicate that molecular dissociation of Ca-bearing molecules produced in micrometeoroid impact vapor are a likely source.



Burger et al. (2014), *Icarus*.