

Magnetic Holes in the Martian Space Environment

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The planetary magnetosphere is a natural laboratory for studying plasma processes. There are significant differences in the magnetosphere of four terrestrial planets, which provides the opportunity for the comparative analysis of some basic plasma processes/structures. Magnetic holes are a kind of small-scale magnetic structure widely existing in the space of the Earth's magnetosphere, but there are still some controversies on their excitation mechanism, evolution process, and morphological characteristics. Through comparative studies of the characteristics of magnetic holes in the Martian space environment, we can better understand the formation and evolution of magnetic holes.

Based on measurements of the Mars Atmosphere and Volatile Evolution (MAVEN) mission, we have found that magnetic holes are also widely existed in the Martian space environment. We investigate on their generation mechanisms, statistical characteristics, evolutions, and the space weather effects. By comparing the magnetic holes in the Earth's environment, we can gain a deeper understanding of the physical properties of these structures.

References

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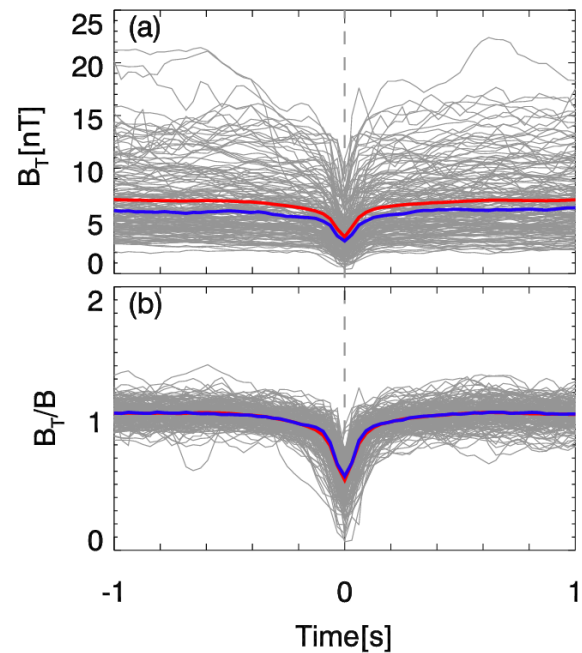


Figure 1 Superposed epoch analysis of all the isolated small-scale LMHs: (a) the total magnetic field magnitude, and (b) the ratio of the total magnetic field magnitude to the average ambient magnetic field magnitude B . All the events are shown in grey lines.