

THE BOW SHOCK AND UPSTREAM WAVES OF VENUS AND MARS

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Because they both lack measurable global magnetic fields, Venus and Mars are often compared to each other in terms of their solar wind interaction. Upstream from each planet the most distant signs of this interaction occur at the bow shock, and in regions upstream from the shock where plasma waves are observed. In many respects the collisionless shocks at Venus and Mars are quite different. The Martian shock is located farther from the planet (with respect to planetary size) and is more variable than the Venus shock. In addition, the position of the Martian shock is not observed to correlate with the solar cycle, unlike the case at Venus. These differences indicate that the solar wind obstacles at the two planets are somehow quite different. However, the characteristics of observed upstream waves at the two planets (and at other solar system bodies) suggest that similar processes are at work at both shocks, and that the size and shape of the shock do not play significant roles in wave generation or damping. This review compares observations of the bow shocks and upstream waves at Venus and Mars, with reference to model predictions and observations at Mercury and Earth.