



Comparative Study of Electromagnetic Waves at the Bow Shocks of Venus and Earth

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Although the solar interactions with Venus and Earth are quite different in many ways, they both have bow shocks formed upstream of the planet where the solar wind decelerates from a super- to sub- magnetosonic flow. In the upstream foreshock region, there is abundant wave activity generated by the shock or by the back-streaming ions and electrons from the shock. In the downstream magnetosheath region, there is also abundant wave activity either locally generated by the heated electrons or ions from the shock or transported from the shock or foreshock regions by the solar wind. The magnetometers of Venus Express and Magnetospheric Multiscale missions both occasionally record 128 Hz data during their shock crossing, which allow us the search for and analyze waves at such high frequencies. We have found short-duration wave bursts around both Venus and Earth bow shocks, with certain similarities. These waves are mostly quasi-perpendicular propagating and have amplitude and occurrence rate decreasing with distance from the bow shock. In this paper we perform statistical and comparative studies on wave properties to understand their generation mechanisms and their effects to the shock or magnetosheath plasmas.