



## **The quasi-monochromatic ULF wave foreshock boundary at Venus**

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The location of ULF quasi-monochromatic wave onsets upstream of Venus bow shock is explored using VEX magnetic field data. We report the existence of a spatial foreshock boundary from which ULF waves are present. It is found that the ULF boundary is sensitive to the interplanetary magnetic field (IMF) direction and appears well defined for a cone-angle larger than 30 degrees. In the Venusian foreshock, the slope of the boundary increases with the cone-angle and for a nominal direction of the IMF, it makes an inclination of 70 degrees with the Sun-Venus direction. Moreover, we have found that the velocity of an ion traveling along the ULF boundary presents a qualitative agreement with the hypothesis of a quasi-adiabatic reflection of a portion of the solar wind at the bow shock. For a nominal IMF direction, the ions associated with the boundary have enough momentum to overcome the solar wind convection. These elements strongly suggest that backstreaming ions upstream of Venus bow shock provide the main energy source of the ULF foreshock waves.