



Observations of very-low Mach number inner planet bow shocks during ICMEs

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Interplanetary Coronal Mass Ejections (ICMEs) can have a significant impact on planetary magnetospheres. Previous research has found very-low Mach number quasi-perpendicular bow shocks occur at Venus during ICMEs. These shocks occur during the magnetic cloud phase of the ICME when the proton density and temperature are low for the solar wind, while the magnetic field magnitude remains relatively large. As such, the Alfvén velocity is abnormally high, resulting in the observed very-low Mach number shocks. Previous research has suggested that the dominant downstream energy redistribution process at these shocks is kinematic collisionless relaxation of the ion distribution. Here we extend these observations to other inner planets and compare the structure of these very-low Mach number shocks.