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Interplanetary Shocks observed by STEREO

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STEREO observations during the extended solar minimum have provided a good opportunity to study interplanetary shocks driven by solar wind stream interactions. These shocks have low-moderate Mach number (Mms 1.1$\sim$2.5) and in most cases are quasi-perpendicular. In the past years only a few shocks driven by interplanetary coronal mass ejections (ICMEs) were observed. In general they had small Mach numbers (Mms $<$ 2). As solar activity increases as part of cycle 24 we expect to observe more shocks driven by ICMEs. For very fast ICMEs, these shocks can be stronger with higher Mach numbers than stream driven shocks. Solar wind properties are modified by shocks, and they participate in the acceleration of solar energetic particles. They are responsible for the generation of extended regions where low frequency waves are present. The extension and characteristics of the waves depend strongly on shock geometry and Mach number. In this work we study the upstream and downstream regions of interplanetary shocks observed by STEREO. We also study the transition that shock profiles suffer with Mach number, i.e. from subcritical into supercritical regimes. We also investigate possible differences between shocks associated with SEP events and shocks where no such events are present.