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# Multipoint study of interplanetary shocks

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Interplanetary (IP) shocks are driven in the heliosphere by Interplanetary Coronal Mass Ejections (ICMEs) and Stream Interaction Regions (SIRs). These shocks perturb the solar wind plasma, and play an active role in the acceleration of ions to suprathermal energies. Shock fronts evolve as they move from the Sun. Their surfaces can be far from uniform and be modulated by changes in the ambient solar wind (magnetic field orientation, flow velocity), shocks rippling, and perturbations upstream and downstream from the shocks, i.e. electromagnetic waves. In this work we use multipoint observations from STEREO, WIND, and MESSENGER missions to study shock characteristics at different helio-longitudes and determine the properties of the waves near them. We also determine shock longitudinal extensions and foreshock sizes. The variations of geometry along the shock surface can result in different extensions of the wave and ion foreshocks ahead of the shocks, and in different wave modes upstream and downtream of the shocks. We find that the ion foreshock can extend up to 0.2 AU ahead of the shock, and that the upstream region with modified solar wind/waves can be very asymmetric.