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Radial speeds of an extreme Interplanetary Coronal Mass Ejection and its shock

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During the current solar cycle, our star has been less active when compared to the previous cycles. This is reflected in lower sunspot numbers but also in a lesser number of observed Coronal Mass Ejections (CME) and their interplanetary counterparts (ICME). However, lower solar activity does not necessarily mean less powerful events. Here we study propagation of an ICME that was detected by the STEREO A spacecraft on July 23, 2012. This was the most extreme event observed since the beginning of the space era. The magnetic field inside this ICME reached maximum value of 109 nT. The average ICME transit speed at 1 AU was 1910 kms^{-1}, while its average speed on the way to 1 AU was 2125 kms^{-1}. The ICME drove a fast-mode shock that preceded it. At the shock the plasma speed rose to 2250 kms^{-1}. We study the propagation of the shock and of the ICME itself by using the radio data from the STEREO WAVES (S/WAVES) onboard of the STEREO A spacecraft. Since the shock emitted Type II radio emission, we are able to reconstruct its speed at various heliocentric distances. We also compare the measured velocities and arrival times of the shock and of the ejecta with predictions from numerical models.