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## VAN ALLEN PROBES OBSERVATION OF PROMPT ENERGIZATION OF ELECTRONS TO ULTRA-RELATIVISTIC ENERGIES DURING THE 17 MARCH 2015 IP SHOCK

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On 17 March 2015, a strong interplanetary shock impacted the Earth's magnetosphere, which resulted in a super-geomagnetic storm with minimum Dst reaching below -200 nT. The radiation belts responded to the shock and subsequent coronal mass ejection both in a gradual and impulsive manner. While the gradual response led to a build-up of ultra-relativistic electron fluxes, which peaked over several days, the shock itself also resulted in rapid, almost instantaneous energization. Energetic particle instruments onboard Van Allen Probes observed this near instantaneous energization of electrons to ultra-relativistic energies, which were seen deep within the magnetosphere at L~3.3 injected as a result of the shock impact. We present electron measurements from the Relativistic Electron-Proton Telescope (REPT) and the Magnetic Electron Ion Spectrometer (MagEIS) onboard the Van Allen Probes mission. We discuss both the gradual development and the prompt energization of radiation belt electrons. Other aspects of this unique event include the so-called butterfly pitch angle distributions observed deep inside the magnetosphere. These kinds of pitch angle distributions are normally seen at high L shells and are attributed to drift shell splitting. The high-energy electron observations are complemented by the electric and magnetic field measurements from the Electric and Magnetic Field Instrument Suite and Integrated Science (EMFISIS) instrument. In-situ measurements from the WIND and Themis are used to fully characterize the interplanetary shock properties.

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