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## Formation and Magnetospheric Impacts of the Foreshock Bubble

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We present multi-point observations of foreshock transient events and their impact on the Earth's magnetosphere. The four Magnetospheric Multiscale (MMS) spacecraft observed two discontinuities in a quasi-perpendicular bow shock regime on 18 December 2017. A textbook example of a foreshock bubble (FB) was observed in the region upstream of the first discontinuity. The FB is identified by a greatly decelerated and deflected antisunward flow, a significant increase in temperature, and depressed plasma densities and magnetic field strengths in the core of the FB. There is only one shock and it lies on the upstream side of the discontinuity. No bubble attends the second solar wind discontinuity. We will investigate the relationship between the formation of the foreshock bubble and the IMF/solar wind conditions and the local/global impacts of each discontinuity with/without a foreshock bubble on Earth's magnetosphere and ionosphere. We note the presence of enhanced fluxes of energetic particles ( $E > 50$  keV) within both the FB event and the second discontinuity and will address the sources and acceleration mechanisms for these energetic particles.

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