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New Insights on the Inner Magnetosphere from the Van Allen Radiation Belt Storm Probes Mission

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The Van Allen Radiation Belt Storm Probes Mission consists of two identically-instrumented satellites in a near geosynchronous transfer orbit (apogee ~ 5.7 Re). Each satellite has a full complement of particle, fields, and waves instruments designed to answer some of the fundamental questions about radiation belt acceleration, transport, and loss as well as providing key measurements of the general inner magnetosphere dynamics in which they operate. The two satellites have slightly different orbital periods which provides different phasing of the satellites and the wide range of radial and azimuthal separations that allow unambiguous separation of spatial and temporal features. Many of these measurements are the first ever of their kind. Within the first few months of operation the Van Allen mission has achieved several of its primary science objectives as well as having discovered new features that raise new questions. In this overview we will present some of the key science results to date including definitive evidence of local acceleration by wave-particle interactions, an analysis of the unstable plasma distributions responsible for wave generation, and plasmaspheric structure as a function of ion composition. We will also present several newly-discovered features of the radiation belts and inner magnetosphere that illustrate how much more there is to learn.

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