

# **Waves in the Earth's Radiation Belt: The Electric and Magnetic Field Instrument Suite with Integrated Science on the Radiation Belt Storm Probes**

CRAIG A. KLETZING

*Department of Physics and Astronomy, The University of Iowa, Iowa City, Iowa,  
USA*

The physics of the creation and loss of radiation belt particles is intimately connected to the electric and magnetic fields which mediate these processes. A large range of field and particle interactions are involved in this physics from ions and ring current magnetic fields to microscopic kinetic interactions such as whistler-mode chorus waves with energetic electrons. To measure these kinds of radiation belt interactions, NASA will launch the two-satellite Radiation Belt Storm Probes (RBSP) mission in 2012. As part of the mission, the Electric and Magnetic Field Instrument Suite and Integrated Science (EMFISIS) investigation is an integrated set of instruments consisting of a tri-axial fluxgate magnetometer (MAG) and a Waves instrument which includes a tri-axial search coil magnetometer and which measures AC electric and magnetic fields from 10 Hz to 400 kHz. Examples of key wave science such as the interactions of radiation belt particles with various wave modes such as VLF hiss, magnetosonic equatorial noise, electromagnetic ion cyclotron waves, and chorus are presented along with overall mission and instrument complement.

Keywords: Radiation belts; Plasma waves; Particle acceleration