

LA-UR-24-24089

=====
Title
=====

Global plasmaspheric dynamics and the role of cold plasma in radiation belt loss

=====
Abstract
=====

Cold plasma plays a critical role in mediating wave-particle interactions, including those contributing to acceleration and loss in Earth’s radiation belts. In particular, plasmaspheric structures can facilitate electromagnetic ion cyclotron (EMIC) wave growth as well as subsequent resonance with radiation belt electrons. Here we’ll highlight recent findings on both the overall dynamics of Earth’s plasmasphere, as well as the importance of this region for controlling EMIC wave structure and radiation belt loss. Utilizing observations from the dual Van Allen Probes, we examine the complex plasmaspheric erosion and refilling processes, in the context of past observations and current understanding. We also highlight a few event studies combining coordinated low and high altitude measurements to explore the role of the plasmopause in wave and precipitation spatio-temporal structure. These studies demonstrate the global significance of local cold plasma boundaries and the interconnected nature of the magnetospheric system.