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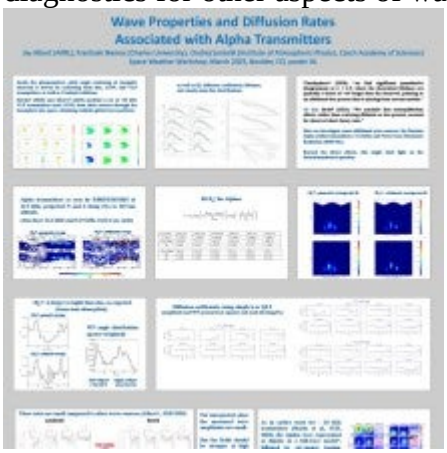
Poster
Radiation belt electrons within the plasmasphere are believed to be strongly affected by cyclotron-resonant interactions with waves from various sources. Such waves include plasmaspheric hiss, lightning-generated whistlers, and VLF waves from large Navy transmitters worldwide. Russian Alpha radio navigation transmissions around 12 kHz may also have to potential to contribute, though this depends on their radiated wave power, which has been poorly documented. Recently, have been comprehensively observed and characterized by the Van Allen Probes, as well as modeled from source to space using a full-wave calculation of trans-ionospheric propagation coupled to 3D ray-and-power tracing, allowing detailed comparisons of field amplitudes and wave normal angles. We find the nominal, frequently quoted radiated power for these transmitters to be a large overestimate, and survey other evidence supporting this. We also present quasi-linear pitch angle and energy diffusion coefficients for these waves. By comparing to previously considered wave sources, we show where the effects are expected to be significant, and also where they may be serve as useful diagnostics for other aspects of wave-particle interactions, such as the prevalence of wave ducting.



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