The Use of Orbital Tethers to Remediate Geomagnetic Radiation Belts MATHIAS HUDOBA DE BADYN, University of Washington, RICHARD MARCHAND, RICHARD SYDORA, University of Alberta — The Van Allen radiation belts pose a hazard to spacecraft and astronauts, and similar radiation belts around other planets pose a hazard to interplanetary probes. We discuss a method of remediating these radiation belts proposed by Hoyt, Minor and Cash where a long, charged tether is placed in orbit inside a radiation belt. The electric field of the tether adiabatically scatters the belt particles into a pitch angle loss cone due to absorption of the particles in the atmosphere. We present a test particle calculation which computes the scattered pitch angle of belt particles as a function of initial pitch angle and gyrophase for different particle energies. We then use the moments of the resulting histogram of scattered angle versus initial pitch angle to compute the number density of the belt as a function of time using a Fokker-Planck diffusion model. Finally, we use the characteristic timescales of scattering for particles of different energies to discuss the feasibility of using such a system of tethers as a long and short-term remediation solution.

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