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The Diffraction of Waves through the Polar Ionosphere RUSSELL STONEBACK, ROD HEELIS, ANGELINE BURRELL, University of Texas at Dallas — The Earth and Ionosphere form a resonant electromagnetic structure that produces the well known Schumann Resonances starting around 8 Hz. These resonances were predicted under the assumption that both the Earth and Ionosphere have large horizontal conductivities forming a concentric spherical capacitor. It is also well known that at high latitudes the vertical orientation of the geomagnetic field results in a very low horizontal conductivity. We present a model of electromagnetic wave interactions between the Earth and Ionosphere that includes this significant reduction in conductivity at high latitudes, effectively forming a concentric spherical capacitor with holes (apertures) cut out of the cavity at high latitudes. Electromagnetic waves in space incident upon this low conductivity region, surround by conductive ionosphere (same boundary conditions as an aperture in metal), will diffract through the polar ionosphere. We will present an overview of the model, including comparisons to measured atmosphere/solar wind interactions.

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