ESTIMATE OF JOVIAN HIGH-ENERGY EQUATORIAL ELECTRON FLUX AT RANGE R > 2 Rj, USING DATA FROM THE GALILEO SPACECRAFT'S FINAL FULL ORBIT

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Periapse of the Galileo spacecraft's 34th orbit of Jupiter occurred at a magnetic radial L-value of 2 Rj (jovian radii) and +4 degrees magnetic latitude (both as given by an Offset Tilted Dipole magnetic field model). This is Galileo's only orbit to sample the jovian radiation belts inside 4 Rj. The primary Galileo instrument for this measurement is the Applied Physics Lab's Energetic Particle Detector (EPD), whose data are, as of this writing, being downlinked to Earth. Evidence of the electron radiation was also recorded as background noise in the star scanner (SS). That data is available, and will be reported here. Comparison of the EPD's DC3 channel with SS background counts on previous orbits shows that the SS and DC3 count rates approximately track one another from 10 Rj, inward to the measurement limit of 5.5 Rj. The DC3 channel measures electrons of energy E ~> 11 MeV. This is consistent with the energy of electrons that are expected to penetrate the thick shielding around the SS. Therefore, the SS data can be used as a proxy for ~11 MeV electron data. A multiplicative factor of ~ 500 makes the SS counts numerically equal to the DC3 count rates. Inside of 6 Rj, the SS data begins to require correction for photomultiplier tube dead-time. The corrections become quite significant, but a unique aspect of the SS allows us to determine the correction factor to a fair degree of accuracy. The SS is continually measuring the light from a known star. The change in this starlight's measured intensity due to dead-time effects is inversely proportional to the dead-time correction factor we need to apply to the background, radiation-induced counts to get the true magnitude of the counts. Then by scaling the corrected SS counts to produce an equivalent DC3 count rate, and applying the appropriate geometric factor, we derive an integral flux of ~ 11 MeV, near-equatorial electrons. The results, with comparisons to existing models and data, will be presented.