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Energy content of suprathermal ($>$ 3keV) ions in the Kronian magnetosphere measured by the Magnetospheric Imaging Instrument (MIMI) on Cassini: Magnetic field perturbation.

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The Dessler-Parker-Sckopke formula ($\Delta B_{part} = \mu_o U_{part}/2\pi B_o R^3$, where ΔB is the magnetic field disturbance caused by the trapped magnetospheric particles, U is the total particle energy content, B_o is the surface magnetic field and R is the planetary radius), has been used in Earth's magnetosphere to estimate the horizontal component of the magnetic field (Dst) produced by the equatorial ring current following the development of magnetic storms. It is of interest to test this method for the magnetosphere of Saturn. This is made possible by the MIMI set of instruments using combined measurements ($>$ 3 keV) from the CHEMS (Charge-Energy-Mass Spectrometer) sensor, which determines uniquely both the mass and charge state of ions, and the Low Energy Magnetic Measurement Spectrometer (LEMMS) at higher ($>$ 230 keV) energies. Based on the extended in-situ observations of the suprathermal (E $>$ 3 keV) ion pressure (Sergis et al., 2007) and the corresponding three-dimensional distribution of such pressure in the Kronian magnetosphere recently published (Krimigis et al., 2007), we can calculate the total ion energy content for E $>$ 3 keV. The calculation is done using

all available Cassini-MIMI measurements obtained during the first 3.5 years of Cassini in orbit. The results show that the energetic particle energy content is adequate to produce an equivalent Dst value quite close to that reported (Bunce et al., 2007) based on magnetic field measurement analyses and models.