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Turbulent Magnetic Field Fluctuations in the Kronian Magnetosphere

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We analyze statistical properties of magnetic field fluctuations in the magnetosphere of Saturn within the framework of wave turbulence. For that purpose we investigate magnetic field fluctuations with amplitudes $\delta B/B_0 < 0.1$. These fluctuations are analyzed in the local mean magnetic field frame at radial distances of 6.5-15 Saturn radii measured during the first five orbits of the Cassini spacecraft. In the power spectra of these fluctuations, ranging from $8 \cdot 10^{-4}$ Hz to 3.5 Hz, we identify a spectral break around 0.05 Hz followed by a power-law spectral range up to 1 Hz. We calculate mean spectral indices for both parallel and perpendicular components of the magnetic field fluctuations and show that the spectral indices of the low frequency range before the spectral break are broadly distributed. In contrast, the spectral indices of the high frequency range exhibit a much narrower distribution with mean values of $\sim$2.5 for both parallel and perpendicular spectra. Further we investigate the statistic moments of third and fourth order of the increment time series, which show considerable deviations from a gaussian distribution indicating intermittency.