

**CASSINI ORBITER SCALAR HELIUM MAGNETOMETER
MEASUREMENTS AT EARTH AND IMPLICATIONS FOR SATURN**

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The Earth gravity assist in August 1999 provided a demonstration of the performance of our magnetic field investigation in a well-characterized planetary field and magnetosphere most like Saturn's. While the spacecraft was within 4 Earth radii, the helium magnetometer operated in the scalar mode, returning rapid samples of the Larmor frequency equivalent to highly accurate measurements of the ambient field magnitude. The analysis began with removal of the planetary field contribution using the best available model of the internal field to obtain the disturbance field associated with an on-going magnetic storm. The disturbance field was then characterized as a function of radial distance and local time using a functional form derived from a series of POLAR magnetic field measurements near perigee. Moderate adjustments to the coefficients yield a highly accurate representation of the field responsible for Dst. In the next step in analysis, the disturbance field was removed from the data and the moments of the internal field were subtracted in succession beginning with the low degree and proceeding to the high degree moments. The result demonstrates the ability of the scalar mode to provide accurate determinations of the high degree moments of Saturn's field.