Saturn's Magnetic Field: Modeling and Predictions for Cassini

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The Cassini spacecraft is en route to Saturn and will arrive there on July 1 of 2004. Cassini is equipped with both a fluxgate vector magnetometer and a helium magnetometer, which has vector and scalar modes of operation. Fluxgate vector measurements along with scalar measurements made by the helium sensor when Cassini is close to Saturn will be used to accurately determine the magnetic field and its higher order moments (up to fifth order). In preparation for Saturn orbit insertion and a four-year tour with more than seventy orbits, we have reexamined existing magnetic field models and magnetic field data obtained by the Pioneer-11 spacecraft during its brief Saturn flyby in 1979. We predict what might be measured by Cassini both at orbit insertion, when Cassini will come as close as 1.3 Saturn radii, as well as the remainder of the four-year tour.