Abstract Submitted
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Measuring Error Fields in ITER Before Its First Plasma[1] M.G. BELL, N. POMPHREY, PPPL, A.H. BOOZER, Columbia U. — ITER is concerned about the possible impact of magnetic field errors on plasma operation and stability. It proposes to measure field errors due to imperfections and misalignments of the coils prior to the first plasma operation so that errors, particularly those with toroidal harmonic $n = 1$, can be corrected with its set of non-axisymmetric coils. ITER presents challenges for such measurements because of its scale, its superconducting coils and the use of ferromagnetic inserts inside the toroidal field coil to reduce the intrinsic $n = 18$ ripple. The sets of partial flux loops in ITER which span the inner poloidal circumference of the vacuum vessel at six toroidal locations provide a way to measure the field normal to the vacuum vessel surface. If appropriate metrology is performed on these loops after installation, it should be possible to determine from a data set in which all poloidal field coils are separately energized, the field errors with $n = 1$ and poloidal harmonics $m = 1 - 3$ in the plasma region. A method is proposed to correct for the possible influence of the ferromagnetic inserts. Measurements made with Hall-effect sensors at several locations *outside* the toroidal field coil together with NMR sensors inside the coil may provide the simplest way to characterize its field errors.

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