

Abstract Submitted
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Assessment of Error Field Control with the “ $n = 1$ Coil”¹ C. PAZ-SOLDAN, ORISE, E.J. STRAIT, R.J. LA HAYE, R.J. BUTTERY, General Atomics, J.M. HANSON, Columbia U., M.J. LANCTOT, LLNL — Small deviations from the nominally axisymmetric field of a tokamak (termed the ‘error field’) can drastically alter plasma performance. Improved performance can be achieved using arrays of non-axisymmetric coils to optimize the error field. One metric for evaluating error field control is the locked-mode density limit in Ohmic plasmas, where better compensation allows operation at lower density. Based on this metric, not all coils are equally beneficial for error field control. On DIII-D, the best correction was achieved by using a circular coil (called the ‘ $n = 1$ coil’) placed above and off-center to the machine in conjunction with an array of midplane saddle coils (called the ‘C-coil’) [1]. We use recently developed analysis techniques that include the plasma response to examine why this coilset proved so successful on DIII-D. The distinct roles of resonant and non-resonant error fields will be assessed.

[1] J.T. Scoville and R.J. La Haye, Nucl. Fusion **43**, 250 (2003).

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C. Paz-Soldan
ORISE

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