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Design of a 3D Magnetic Diagnostic System for DIII-D[1] J.D. KING, ORAU/ORISE, E.J. STRAIT, R.L. BOIVIN, R.J. LA HAYE, L.L. LAO, General Atomics, D.J. BATTAGLIA, N.C. LOGAN, Princeton Plasma Physics Laboratory, J.M. HANSON, Columbia U., M.J. LANCTOT, Lawrence Livermore National Laboratory, A.C. SONTAG, Oak Ridge National Laboratory — A new set of magnetic sensors has been designed to diagnose the 3D plasma response due to applied resonant magnetic perturbations (RMPs). The system will also allow for detailed investigation of locked modes and the effects of error fields. This upgrade adds more than 100 co-located radial and poloidal field sensors positioned on the high and low field sides of the tokamak. The sensors are arranged in toroidal and poloidal arrays. Their dimensions and spacing are determined using MARS-F and IPEC model predictions to maximize sensitivity to expected 3D field perturbations. Irregular toroidal spacing is used to minimize the condition numbers for simultaneous recovery of toroidal mode numbers $n \leq 4$. A subset of closely spaced sensors will also be installed to measure short wavelength MHD such as ELM precursors and TAEs.

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