

Abstract Submitted  
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**Upgrades and new applications of the DIII-D magnetic diagnostics system** STEFANO MUNARETTO, E J STRAIT, General Atomics - San Diego — The complexity of the magnetic diagnostic system of DIII-D increased over the years in order to provide complete and reliable information about the plasma and to adapt to the evolving research focus. Magnetic measurements are used to provide fundamental information about the plasma, such as its position and shape, the presence and nature of MHD instabilities and other toroidal asymmetries, both in real time and for post discharge analysis. These quantities vary by several orders of magnitude in terms of amplitude and of the scale of temporal evolution. A new solution, based on terminal strips and plug-in connectors, allows for a clean and flexible signal processing system while maintaining low noise and drift that enables the detection of magnetic fields ranging from Gauss to Tesla. The detection of the weak and quasi-static fields requires a large set of sensors. We present here how this system has been upgraded to maintain its original capabilities after new hardware installations in the machine and how its use has been expanded for real time MHD spectroscopy and real time distinction of magnetic fields coming from the plasma and from eddy currents in the wall, both of which enhance disruption prediction capabilities at DIII-D. Work supported by US DOE under DE-FC02-04ER54698.

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