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10.1 Recent Developments and Near-term Plans for DIII-D Diagnostics

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The DIII-D diagnostic set combines expansions of established systems with implementations of new technologies to improve measurement and associated model validation from the boundary to the core plasma. A recent addition of translatable in-vacuum mirrors controllably alters a laser path within the Thomson Scattering system to adapt to the divertor geometry of particular experiments. The resulting electron density and temperature measurements provide information concerning detachment in the divertor. A new system is the Imaging Neutral Particle Analyzer (INPA), which measures radial profiles of core energetic ion density over narrowly defined regions of velocity space to provide information concerning beam ion transport. Future developments include high-Z spectroscopy suited to transport of tungsten and molybdenum as injected following the commissioning of a Laser Blow Off system. Measurements of the neutral density profile will necessarily become a focus as different divertor geometries are investigated. As four (of eight) neutral beams become capable of off-axis injection, new measurement possibilities will be explored, including flow velocity and ion temperature determination with divertor charge exchange. This work is supported in part by US DOE under DE-FC02-04ER54698.

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