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Initial Operation of the Divertor Thomson Scattering Diagnostic on DIII–D,* T.N. Carlstrom, D.G. Nilson,† D.N. Hill,† C.L. Hsieh, R.E. Stockdale, *General Atomics* — The first Thomson scattering measurements of n_e and T_e in the divertor region of a tokamak are reported. These data are used as input to boundary physics codes such as UEDGE and DEGAS and to benchmark the predictive capabilities of these codes. These measurements are also used to compare with Langmuir probe measurements of n_e and T_e. A Nd:YAG laser (20 Hz, 1 Joule, 15 ns, 1064 nm) is directed vertically through the lower divertor region of the DIII–D tokamak. A custom, aspherical collection lens (*f*/6.8) images the laser beam from 1–21 cm above the target plates into eight spatial channels with 1.5 cm resolution. 2D mapping of the divertor region is achieved by sweeping the divertor X–point location radially through the fixed laser beam location. Fiber optics carry the light to polychromators whose interference filters have been optimized for low T_e measurements. Silicon avalanche photodiodes measure both the scattered and plasma background light. Temperatures and densities are typically in the range of 10–200 eV and $1–10 \times 10^{19}$ m^{-3} respectively. Low temperatures, $T_e < 1$ eV, and high densities, $n_e > 8 \times 10^{20}$ m^{-3} have been observed in detached plasmas. Background light levels have not been a significant problem. Control of the laser straylight permits Rayleigh calibration. Because of access difficulties, no in-vessel vacuum alignment target could be used. Instead, an *in situ* laser alignment monitor provides alignment information for each laser pulse.

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