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4.38 Thomson Scattering measurements on DIII-D using in-vessel laser mirrors to diagnose a new divertor location

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Translatable in-vessel mirrors have enabled the DIII-D Thomson Scattering system to diagnose the divertor plasma in high triangularity plasma shapes. Previous divertor Thomson scattering measurements in DIII-D were restricted to spatial locations along a Nd:YAG laser beam that was directed through a vertical port. This only allowed measurements to be made in low triangularity shaped plasmas. The new mirrors re-route the laser underneath floor tiles to a position of smaller major radius as necessary for high triangularity plasmas. New in-vessel collection optics transmit scattered light from regions inaccessible to external lenses. Damage to mirrors and high stray light levels are challenges that were overcome to successfully make these measurements. Through the careful use of baffles and light shields, stray light leakage into polychromator detector channels was reduced to negligible levels, allowing temperature measurements below 1 eV. The system is described and initial results presented.

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