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High Resolution Pedestal Thomson Scattering System at DIII-D[1]

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Predicting the performance of the next generation of fusion devices requires detailed and precise understanding of the H-mode pedestal characteristics. The development and validation of theoretical models predicting the pedestal height and width is necessary to increase confidence on the extrapolation to burning plasmas. Validating these models requires accurate, high resolution measurements in the region. Accordingly, the DIII-D Thomson scattering system is being upgraded to include high-resolution measurements of the edge of the plasma. Preliminary investigation indicates that sub-centimeter radial resolution will be achievable with limited changes to the existing optics. Details of the upgrade will be presented, including a physical model of the mechanical assembly, an optical model of the system, light collection efficiency, and a physics model to estimate the expected errors in the temperature measurement.

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