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Thomson Scattering Diagnostic for the Scrape Off Layer of Alcator C-Mod[1] JIEXI ZHANG, J.W. HUGHES, YUNXING MA, MIT PSFC — In order to study heat and particle transport in the edge plasma of Alcator C-Mod, a new Thomson Scattering (TS) diagnostic for the Scrape-Off-Layer (SOL) has been designed. It will complement the existing Edge TS system, which measures a minimum electron temperature (T_e) of approximately 50 eV. The SOL TS system is designed to resolve the plasma profile of T_e of 10$\sim$200 eV and electron density (n_e) as low as 1$\sim$2x10^{19} m^{-3} with a radial spatial resolution, dR, of about 2 mm (r/a $\sim$ 0.01). With 1064 nm Nd:YAG laser light as the laser source, we used plasma data from the C-Mod Core TS system as a guide in the design of a new spectral configuration for the 4-channel polychromators. The response of the Avalanche Photodiode (ADP) detectors was modeled to estimate the expected signals and signal to noise ratios (SNR). Simulations including the filters show that the system in the new configuration could produce meaningful measurements with SNR>3 when T_e is 10 eV and n_e is 3x10^{19} m^{-3} or less. The spectral location and bandwidth of each filter are optimized to allow calibration using both Raman and Rayleigh scattering in H_2 and D_2.

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