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An Upgrade of the DIII-D MSE Diagnostic that Utilizes the Counter-Injected Neutral Beam for Improved Current Profile Reconstruction[1] C.T. HOLCOMB, S.L. ALLEN, R.F. ELLIS, R. GEER, R.J. JAYAKUMAR, M.A. MAKOWSKI, J.M. MOLLER, K.L. MORRIS, L.G. SEPPALA, Lawrence Livermore National Laboratory — The motional Stark effect (MSE) diagnostic is being upgraded this year to take advantage of the new DIII-D neutral beam arrangement. Our three existing MSE views will be maintained as they are while a fourth view will be added to image the counter-injected neutral beam. The fourth view will use two separate imaging systems for coverage of the plasma from the magnetic axis to the low-field edge. These systems each contain a single polarization preserving fold mirror and a lens relay system to transfer light to a polarimeter. The details of this design are discussed. The addition of the new views will eliminate a gap in the profile where the existing MSE views cannot accurately discriminate B_z and E_r. Uncertainty in $E_r(R)$ will be reduced by a factor of 2 in the core and 5-6 in the edge. Uncertainty in $B_z(R)$ will be reduced by 20-30%, and the radial resolution will improve by about a factor of 3 in the core.

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