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Optimizing 50kV hydrogen diagnostic neutral beam performance for active spectroscopy in MST[1] X. FENG, J. BOGUSKI, Univ of Wisconsin, Madison, D. CRAIG, Wheaton College, Wheaton, D.J. DEN HARTOG, S. MUNARETTO, M.D. NORNBERG, S. OLIVIA, Univ of Wisconsin, Madison — The 50 kV hydrogen diagnostic neutral beam on MST provides local measurements of impurity ion emission through charge exchange recombination spectroscopy (CHERS) and of core-localized magnetic field through the motional Stark effect (MSE). The beam, which was designed to provide 5A of neutral current at 50 kV to meet these needs, is currently on a test stand to accommodate diagnosis, in order to increase the reliability of beam formation, sustain a steady current of 5 amps for 20ms, and optimize the primary energy fraction. The reliability of arc formation was increased from 40% to 80% success rate with increase of cathode gas pressure from 150kPa to 200kPa, and the stability of the arc current is improved with a decrease of the insulation magnetic field. A calorimeter with 5 thermocouples is installed to measure the horizontal and vertical beam profiles as well as beam divergence. Beam energy components are quantified through Doppler-shift spectroscopy. Preliminary simulation results of the beam using the ALCBEAM code as well as a description of how changes to the beam performance can affect CHERS and MSE measurements are presented.

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