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Validity of atomic models for motional Stark effect diagnostic at low magnetic fields[1] J. KO, D.J. DEN HARTOG, K.J. CASPARY, E.A. DEN HARTOG, University of Wisconsin - Madison — The motional Stark effect diagnostic for the MST reversed field pinch (RFP) deals with Stark spectra generated under low magnetic fields (0.1 to 0.6 T). Therefore, its analysis, in principle, should rely on an atomic model that includes spin-orbit coupling, Zeeman effects, and non-statistical populations of upper states in diagnostic-neutral-beam excitation. Currently, however, no atomic model has been validated to be reliable for these low-field MSE spectra. A recent collisional radiative model [O Marchuk et al, J. Phys. B: At. Mol. Opt. Phys. 43 (2010) 011002] confirms that the observed Stark multiplets deviate from a statistical population, but calculation was done only at high fields (> 1 T). In this work, an operating window of MST RFP plasmas will be explored where a direct spectrum fit (that is, with no atomic model involved) can produce reasonable magnetic field measurements. The Stark intensities as well as the inferred magnetic fields obtained this way will be compared with those from the existing atomic models.

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