analysis. The lines emitted by the MgI-, NaI-, BeI-, and LiI-like ionization states were chosen because they are strong and because the relatively simple atomic structure of these ions (one or two electrons outside a closed shell) allows reliable calculation of the electron impact excitation rates. The NiXXV 118 Å line is blended with strong lines of NiXXII and NIXXIV, and based on calculated relative intensities of the lines [23], the measured brightness of this blend at 118 Å is multiplied by 0.6 to obtain the brightness of the NiXXV line. The CrXXI 150 Å line (BeI-like) was not used because it is blended with the bright OVI 150 Å line. In high density discharges the metallic impurity lines are weak compared to the low-Z impurity lines and some of the lines become blended with carbon and oxygen lines; in such instances, these lines are omitted from the analysis. The calculated brightnesses in Table I assume the central impurity densities given in Table II: 1.1×10^9 cm^{-3} for Ni and 9.0×10^8 cm^{-3} for Cr.

The convective velocity was taken to have the form of equation (4) with $c_v = 1.0$, yielding constant metallic impurity concentration (fraction of n_e) profiles. Brightnesses of nickel lines emitted from significantly different radii provide a constraint on the shape of the metallic impurity density profiles. Figure 4 shows the calculated radial distribution of the higher ionization states of nickel for the example discharge. The NiXXV and NiXXVI lines are primarily emitted from minor radii less than 40 cm, while the NiXVII and NiXVIII lines are emitted from the region between 65 cm and 75 cm. As seen in Table I, the measured and calculated brightnesses of lines from all these ions agree well, within 35% or better; thus, the assumption that the nickel concentration profile is flat is approximately correct. The same procedure is used in the chromium analysis. In general, a flat metallic impurity concentration profile gives good agreement between the measured and calculated line brightnesses. Table II shows that metallic impurities contribute little to Z_{eff} and the total radiated power.

As mentioned earlier, MIST is also used to infer the central carbon-to-oxygen density ratio from ratios of measured brightnesses of $\Delta n = 1$ transitions in the HI- and LiI-like ions. A study was made to determine the sensitivity of this measurement to values of various plasma parameters and transport parameters which are input into the code (see, also, the discussion of Hawryluk et al. [24]). The results are summarized in Table III, where