Supplementary material for referee MNRAS: MN-15-0213-MJ

March 26, 2015

This is a supplementary documenting which presents a few plots to justify the claims made in the response to referee for MNRAS submission MN-15-0213-MJ.

Figure 1 shows the level populations of Helium 1. Levels are split according to TopBase, meaning that they are in energy order and split by s and l quantum numbers.It demonstrates that in the dense regions of the wind in which He I emission tends to occur (Cell 10), the populations are already more or less distributed by statistical weight. The cells in the figure have the following properties:

- cell 10: $T_R = 4.76e+04, T_e = 3.43e+04, n_e = 1.10e+14, W = 3.49e-01$
- cell 96: $T_R = 4.69e+04, T_e = 1.96e+04, n_e = 5.26e+10, W = 6.02e-03$
- cell 200: $T_R = 3.41e+04, T_e = 1.49e+03, n_e = 5.87e+07, W = 1.41e-04$

Figure 2 shows a spectrum. One of the models has arbritrarily fast transitions added between forbidden transitions, to simulate the effect of dominant collisional transitions between these states. The other model is model B from the paper, a model with significant He I emission. The effect on the overall spectrum is completely negligible.

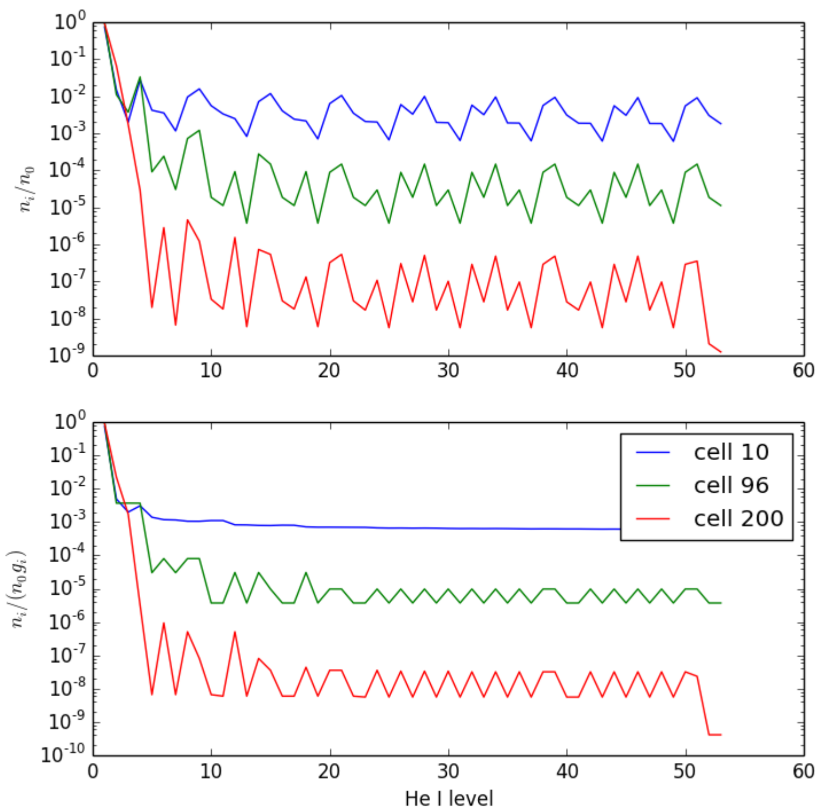

Figure 1: Top Panel: fractional level populations in He I. Bottom Panel: fractional level populations in He I divided by statistical weight. In dense regions the levels are already distributed more or less according to statistical weight. This is due to b-f processes dominating the level populations. As densities decrease, the triplet and singlet populations become somewhat decoupled. This does not affect the model as these cells have negligible line emissivities.

Figure 2: A spectrum will be shown here.