Contour plots for $M_{\rm BOR} \rightarrow D_{\rm j}$

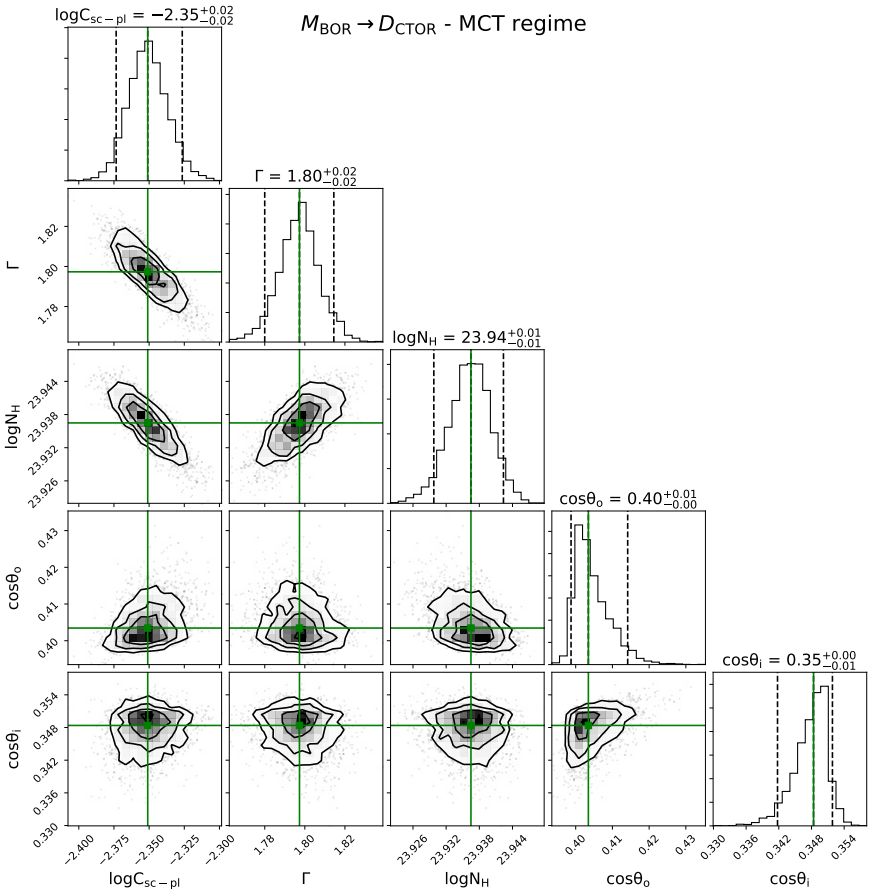

Figure 1: Contours for $M_{\rm BOR} \rightarrow D_{\rm CTOR}$ analysis in the MCT regime, with $N_{\rm H,los} = 100$ as input. The output $N_{\rm H,los} = 86.39$ and $\chi^2/{\rm dof} = 1.04$ implying a good fit even when $T/R = 1$ - frozen during fit.

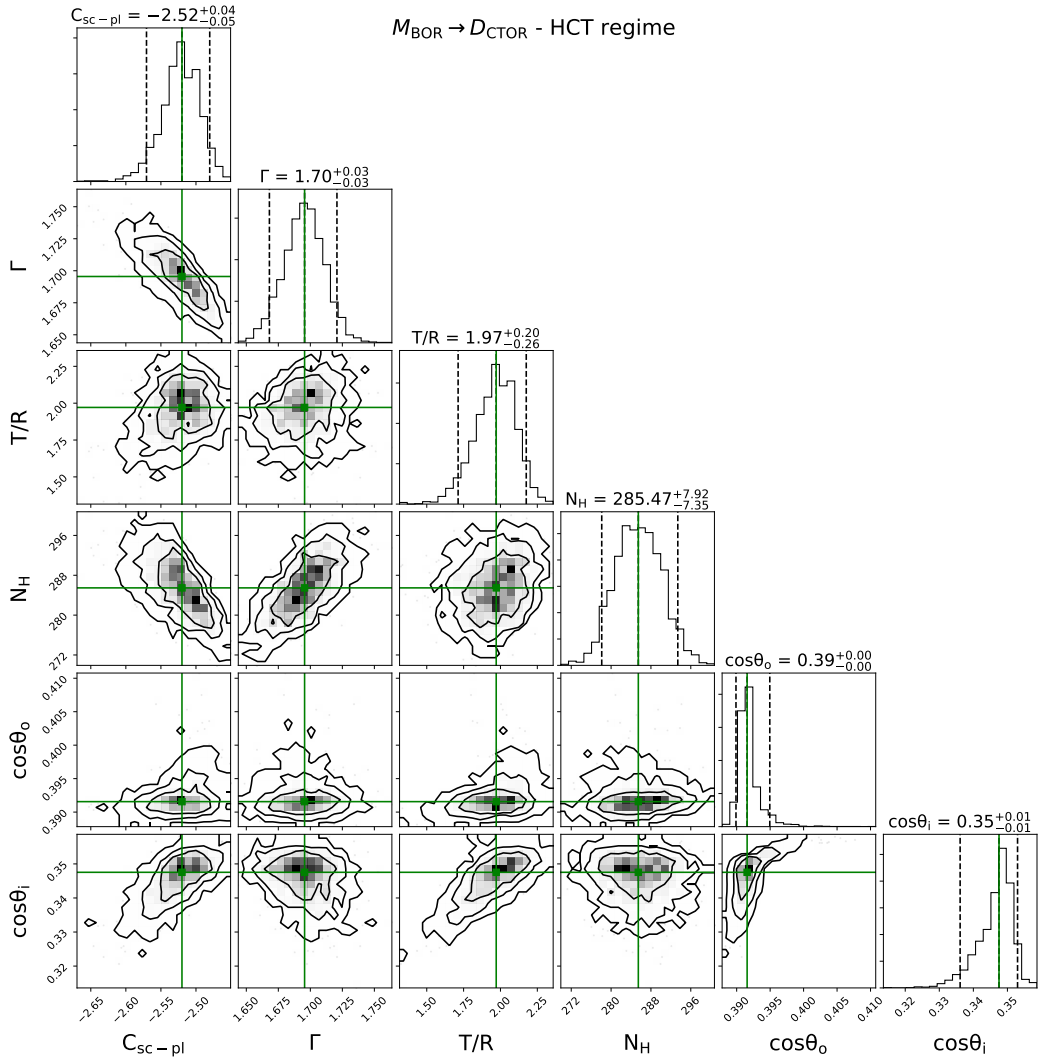

Figure 2: Contours for $M_{\rm BOR} \rightarrow D_{\rm CTOR}$ analysis in the HCT regime, with $N_{\rm H,los} = 500$ as input. $\chi^2/{\rm dof} = 1.19$.

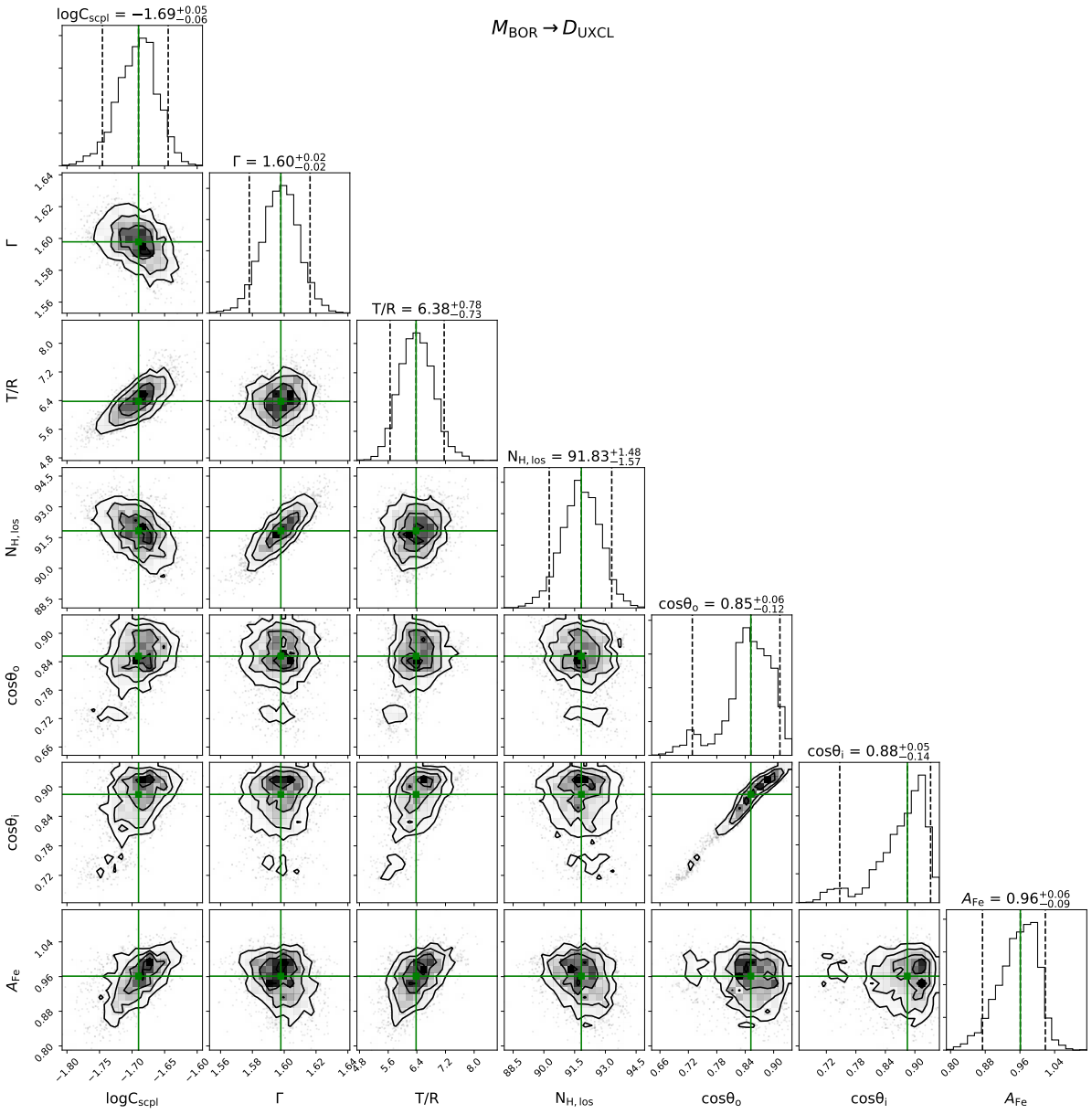

Figure 3: Contours for $M_{\rm BOR} \rightarrow D_{\rm UXCL}$ analysis in the MCT regime, with $N_{\rm H,los} = 100$ as input. In this case the $N_{\rm H,los} = N_{\rm ,Heq}$,we have a bad fit, with $\chi^2 = 1.35$. Additionally, $\cos\theta_o$ ¡ $\cos\theta_i$ is inconsistent with the defined morphology. However, a physical interpretation can be applied to this case assuming an obscurer seperate from that of main torus cloud distribution of the torus which serves as the scatterer or reflector. The obscurer can be a stray clump independent of the main torus, located in the cutout gap. This interpretation is erroneous as we know the data simulated under this model is from a complex clumpy torus.

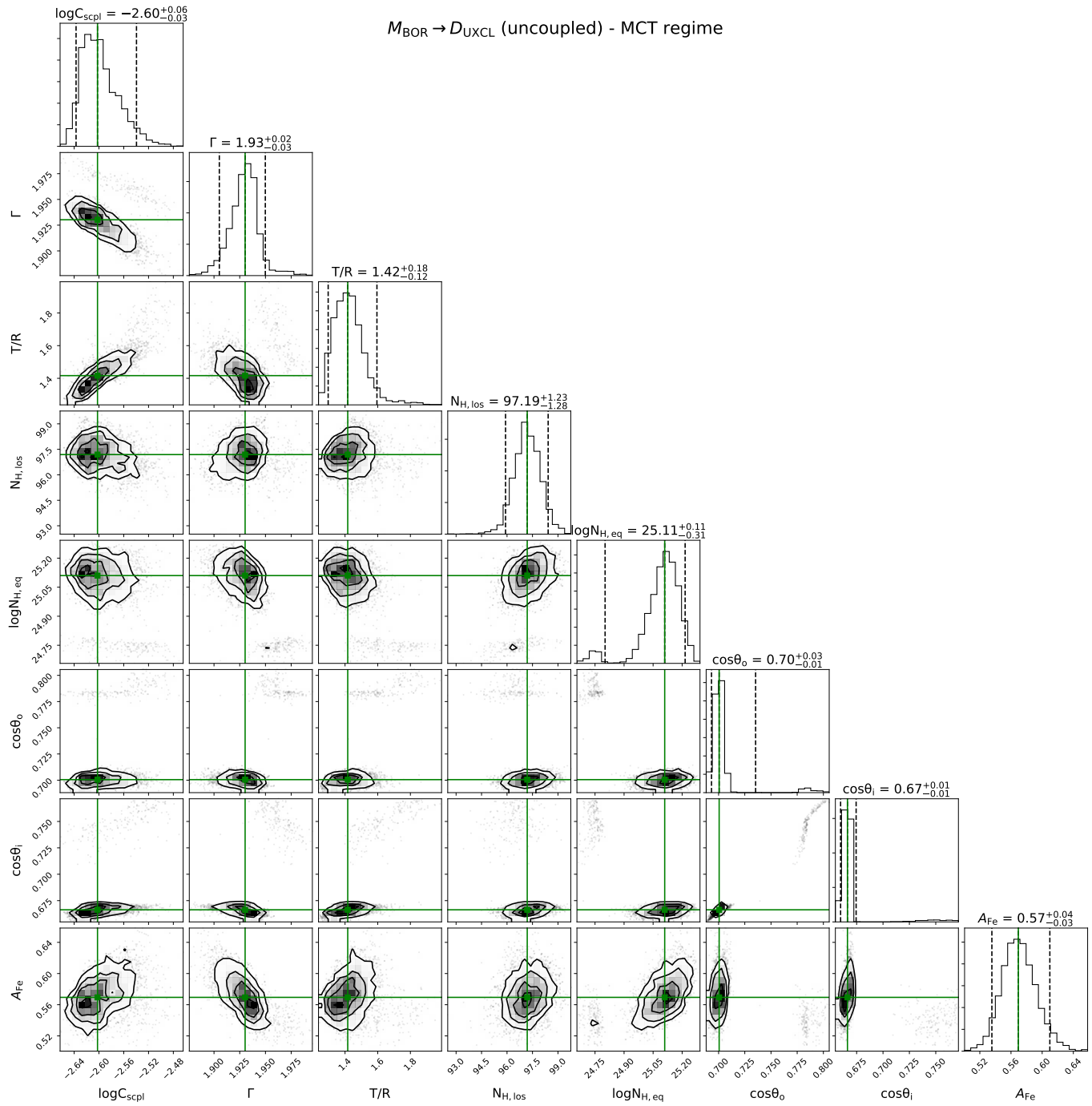

Figure 4: Contours for $M_{\rm BOR} \rightarrow D_{\rm UXCL}$ analysis in the MCT regime, with $N_{\rm H,los} = 100$ as input. In this case the $N_{\rm H,los} \neq N_{\rm H,eq}$ while fitting, we have fit comparatively better than in figure 3, with $\chi^2 = 1.25$. The line of sight absorption $N_{\rm H,los} \simeq 97$ and the torus $N_{\rm H,eq} \simeq 1300$ are discrepant, however $\cos\theta_i$ and $\cos\theta_o$ values if taken at face value implies that the line of sight intersects the torus clouds, which is inconsistent given that $N_{\rm H,los} \neq N_{\rm H,eq}$. A physical interpretation of this is possible if assume the torus to be clumpy, in that case, $\cos\theta_o$ loses the meaning and can be interpretated as covering fraction $C_{\rm frac,tor}$. The fit thus implies a clumpy matter distribution with $N_{\rm H,eq} \simeq 1300$, a line of sight absorption with $N_{\rm H,los} \simeq 97$ with a total $C_{\rm frac,tor} = 0.7$

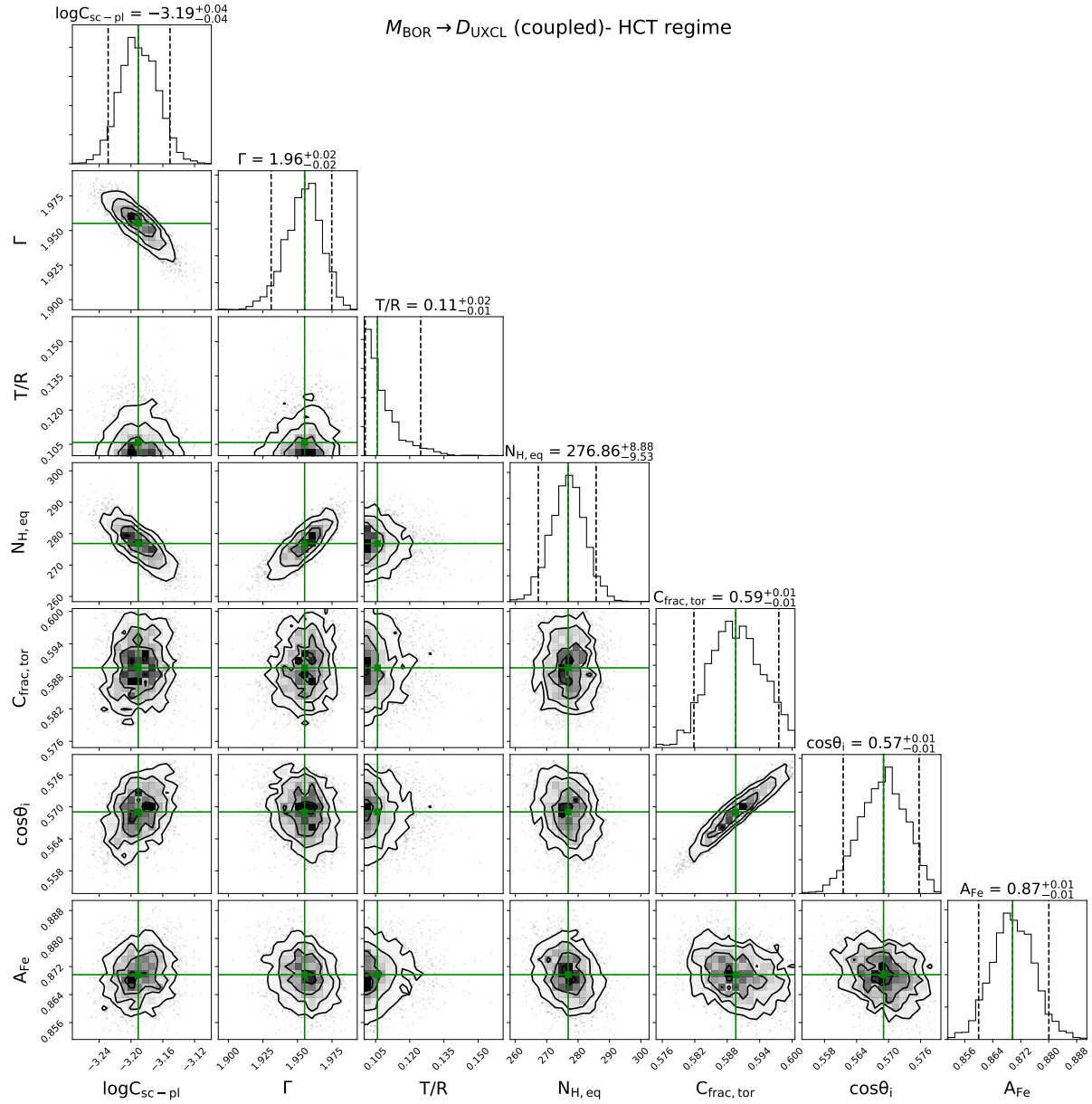

Figure 5: Contours for $M_{\rm BOR} \rightarrow D_{\rm UXCL}$ analysis in the HCT regime, with $N_{\rm H,los} = 500$ and $C_{\rm frac,ring} = 0$ (of inner ring) as input. $\chi^2/{\rm dof} = 1.13$. $N_{\rm H,los} \simeq 225$ is discrepant with the input. The very low value of T/R plays the main role in decreasing the amount of zeroth -order continuum which otherwise is the role of $N_{\rm H,los}$.

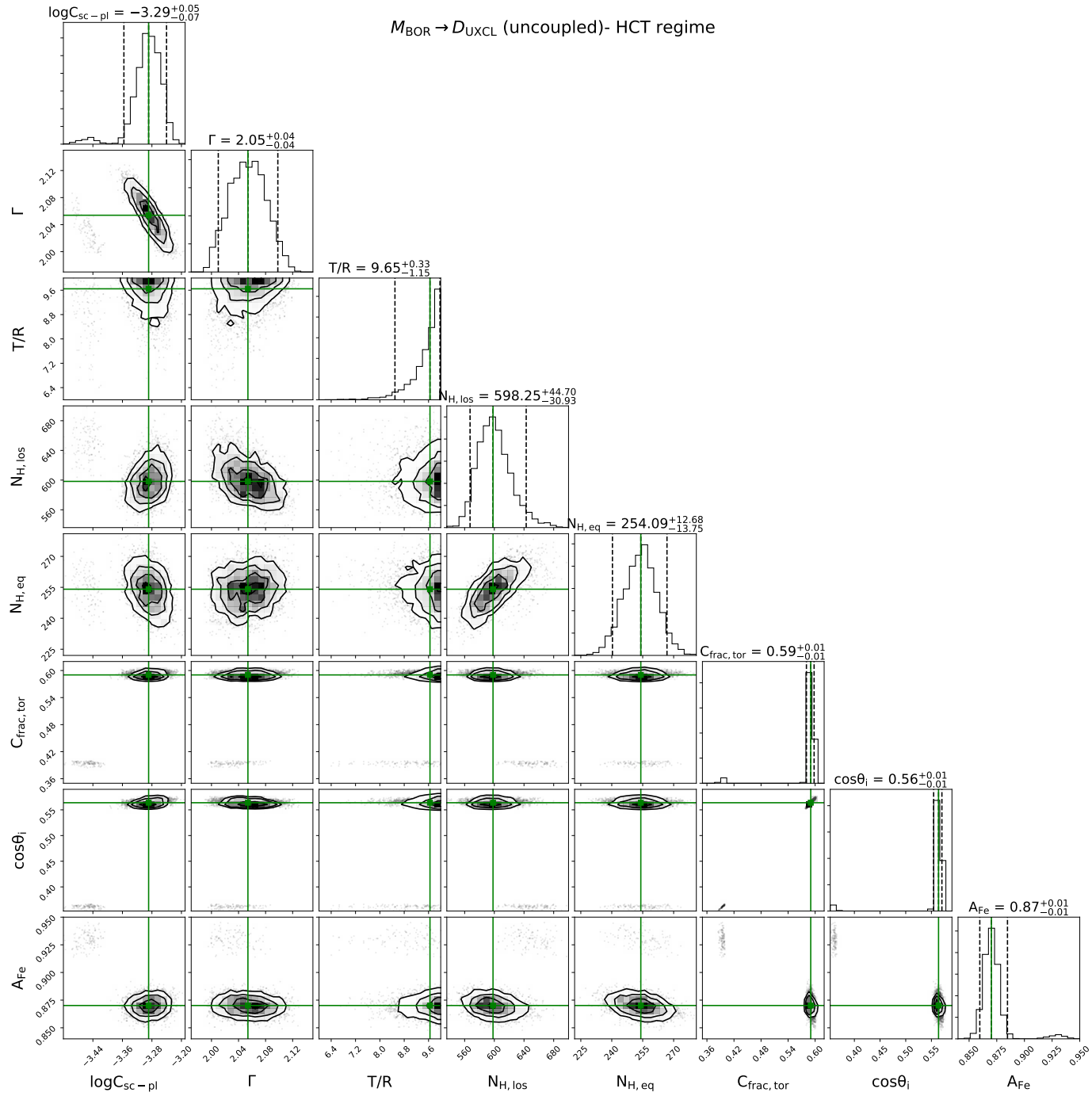

Figure 6: Contours for $M_{\rm BOR} \rightarrow D_{\rm UXCL}$ analysis in the HCT regime, with $N_{\rm H,los} = 500$ and $C_{\rm frac} = 0$ (of inner ring) as input. $\chi^2/{\rm dof} = 1.11$. $N_{\rm H,los} \simeq 600$ is consistent with the input. The $N_{\rm H,eq} \simeq 200$ is discrepant. This mismatch in the $N_{\rm H,los}$ and $N_{\rm H,eq} \simeq 200$ and the case of '$\cos\theta_i$' ¡ $\cos\theta_o$ can be interpreted as a clumpy torus, with '$\cos\theta_i$' as $C_{\rm frac,tor}$. The very low value of T/R allows the flux to be adjusted in the CRH region to fit the CRH of the UXCLUMPY data.

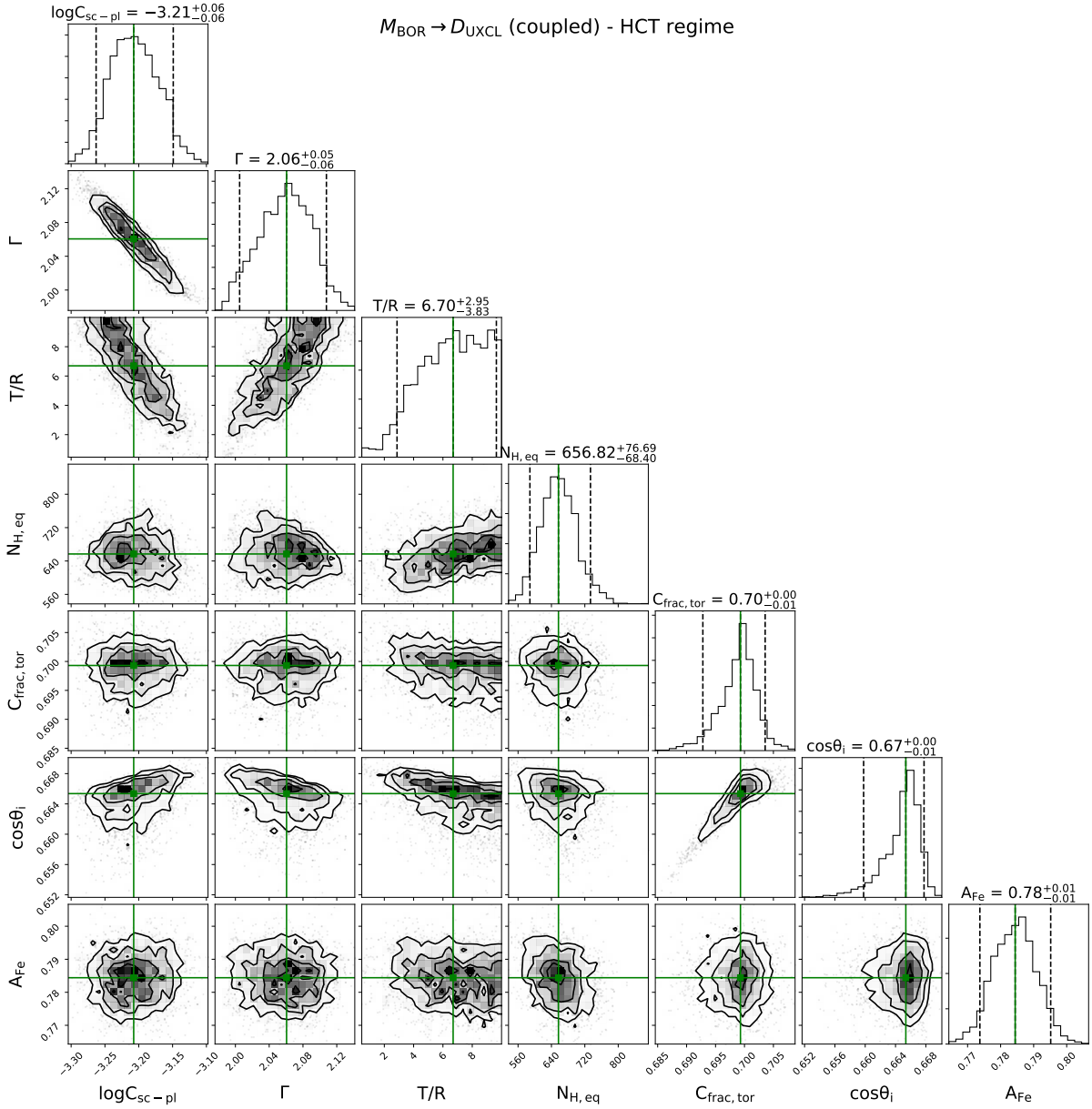

Figure 7: Contours for $M_{\rm BOR} \rightarrow D_{\rm UXCL}$ analysis in the coupled configuration in the HCT regime, with $N_{\rm H,los} = 500$ and $C_{\rm frac} = 0.4$ (of inner ring) as input. $N_{\rm H,los}$ is consistent with the HCT regime. For this case, $\chi^2/{\rm dof} = 1.06$.

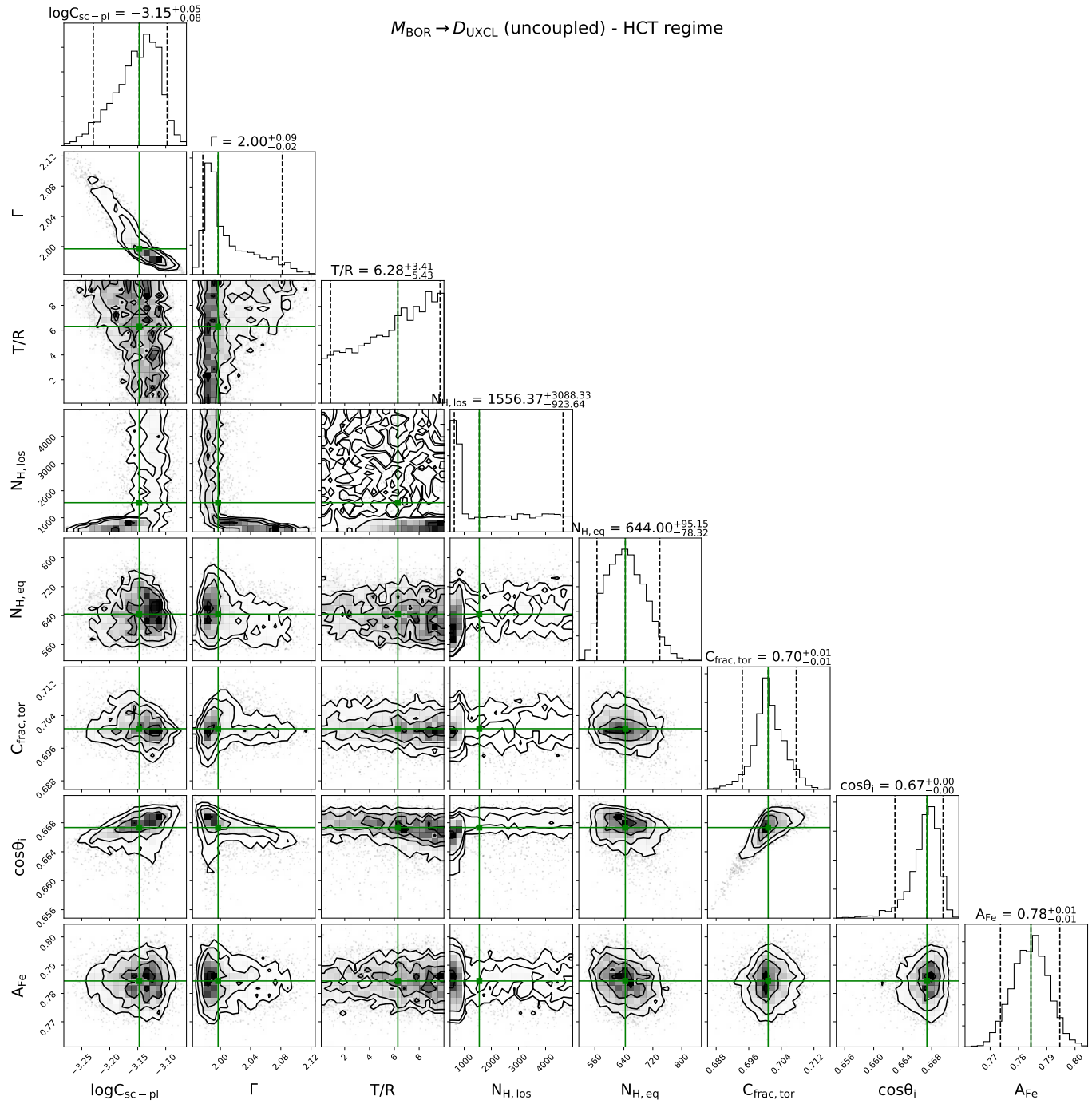

Figure 8: Contours for $M_{\rm BOR} \rightarrow D_{\rm UXCL}$ analysis in the uncoupled configuration in the HCT regime, with $N_{\rm H,los} = 500$ and $C_{\rm frac} = 0.4$ (of inner ring) as input. $\chi^2/{\rm dof} = 1.07$. If we compare this with the coupled configuration, we find the several parameter values are consistent with each other. The irregular posterior of the $N_{\rm H,los}$ in the uncoupled configuration and the fact that $N_{\rm H,los} = N_{\rm H,eq}$ baseline setup gives a good fit suggests that the uncoupled configuration results in the redundant free parameter $N_{\rm H,los}$.