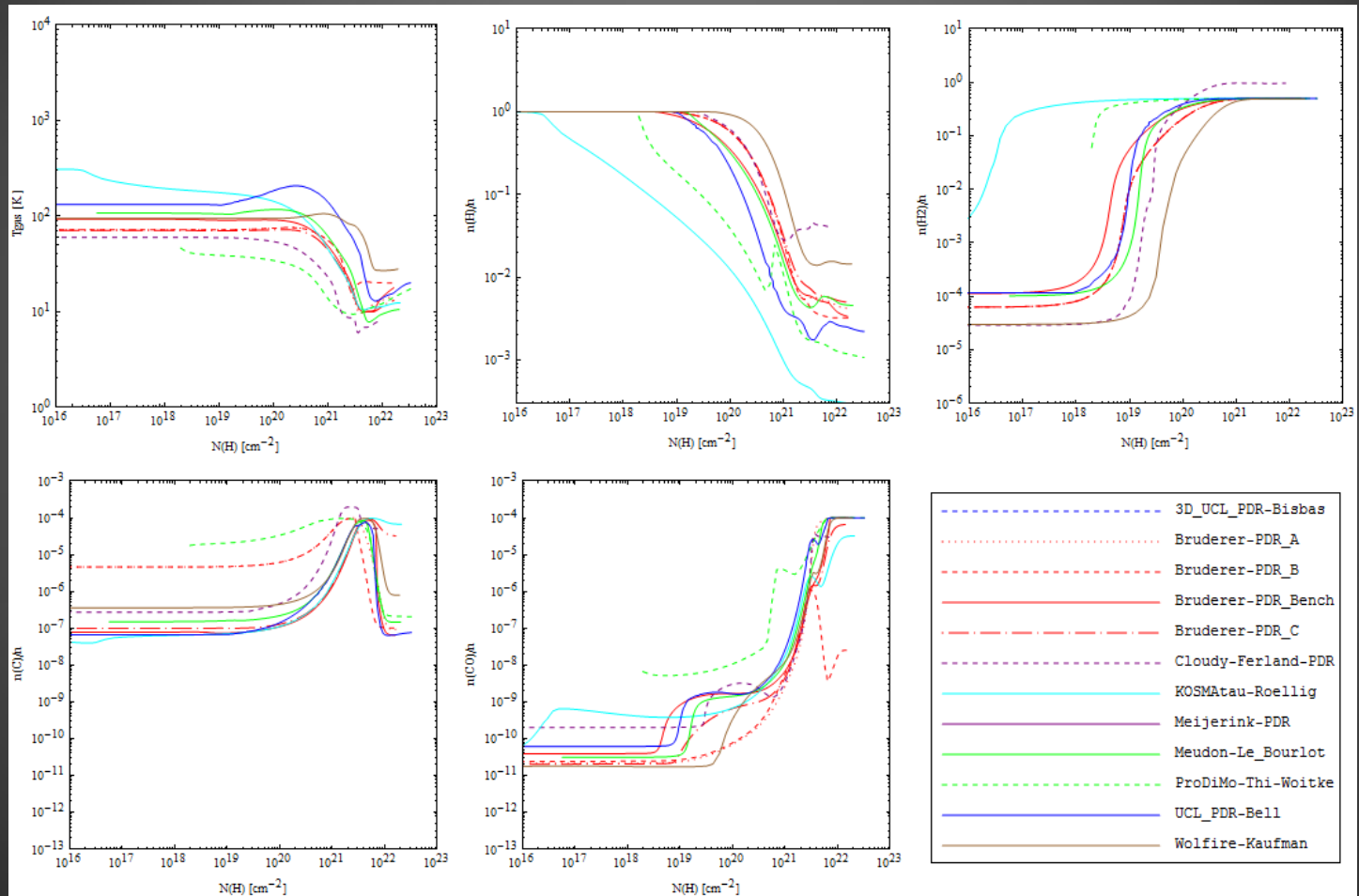


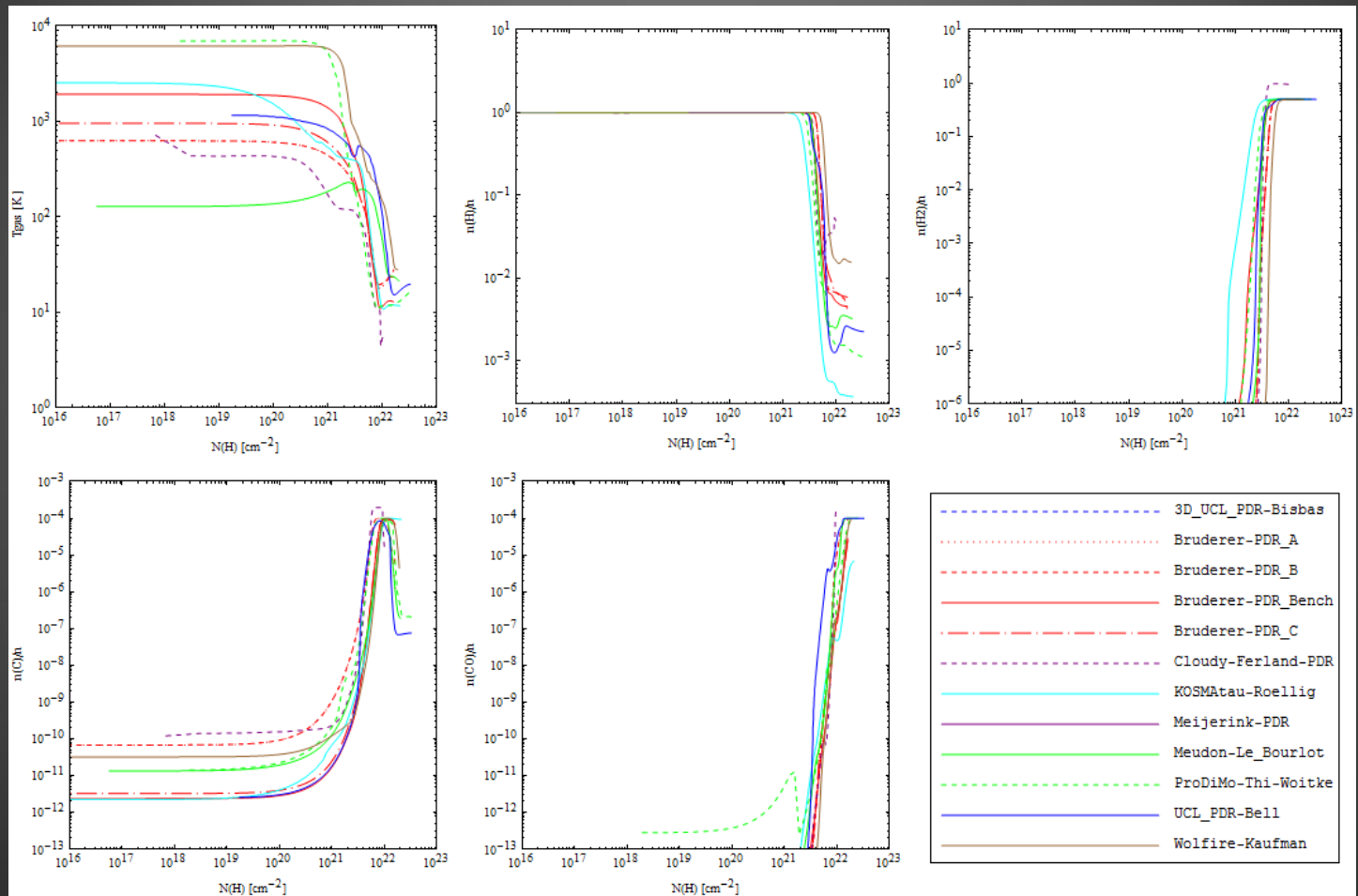
CO Excitation Workshop

PDR Benchmark Progress

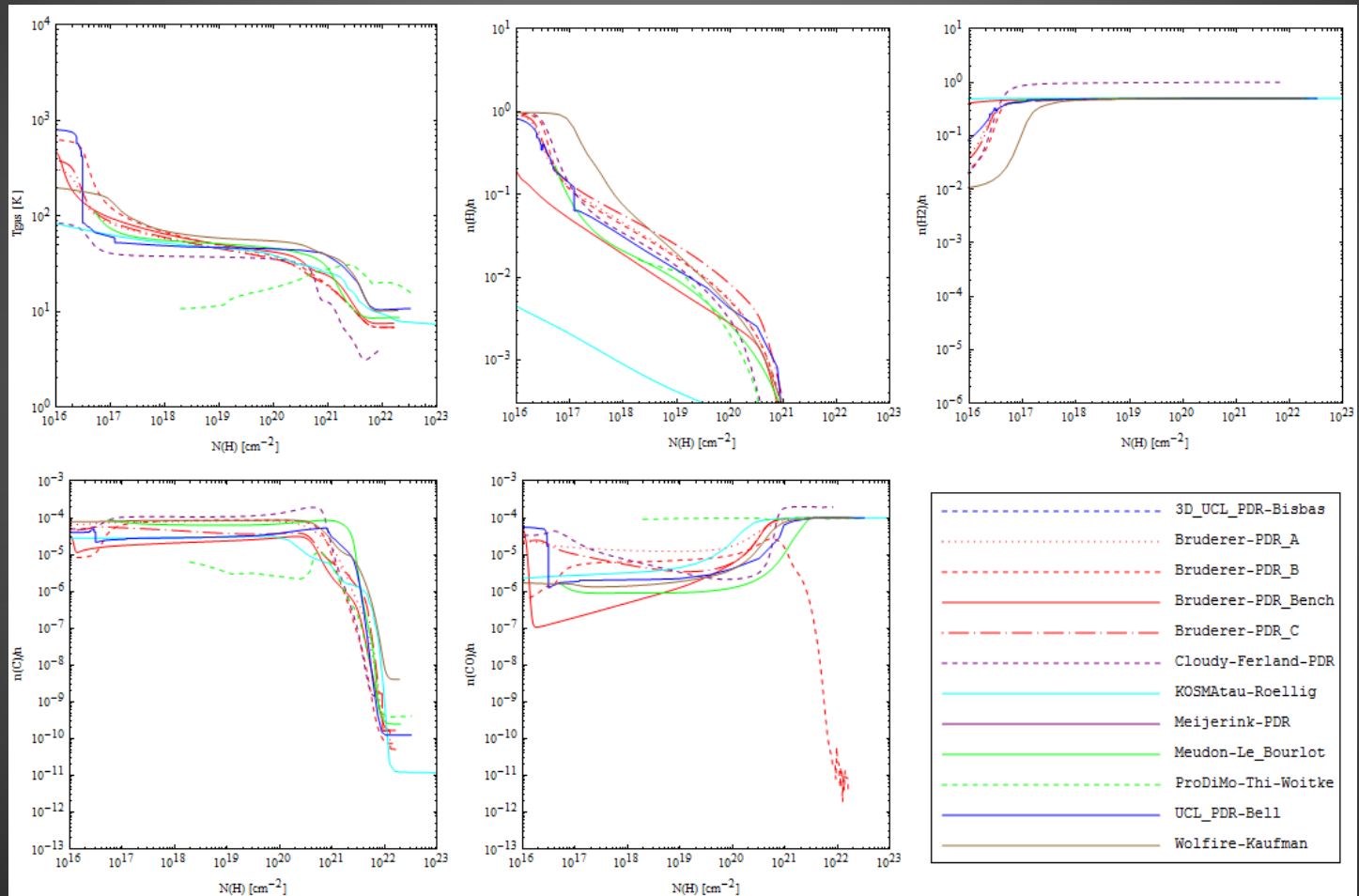
Starting Point PDR-1 ($n=10^3, \chi=10$)



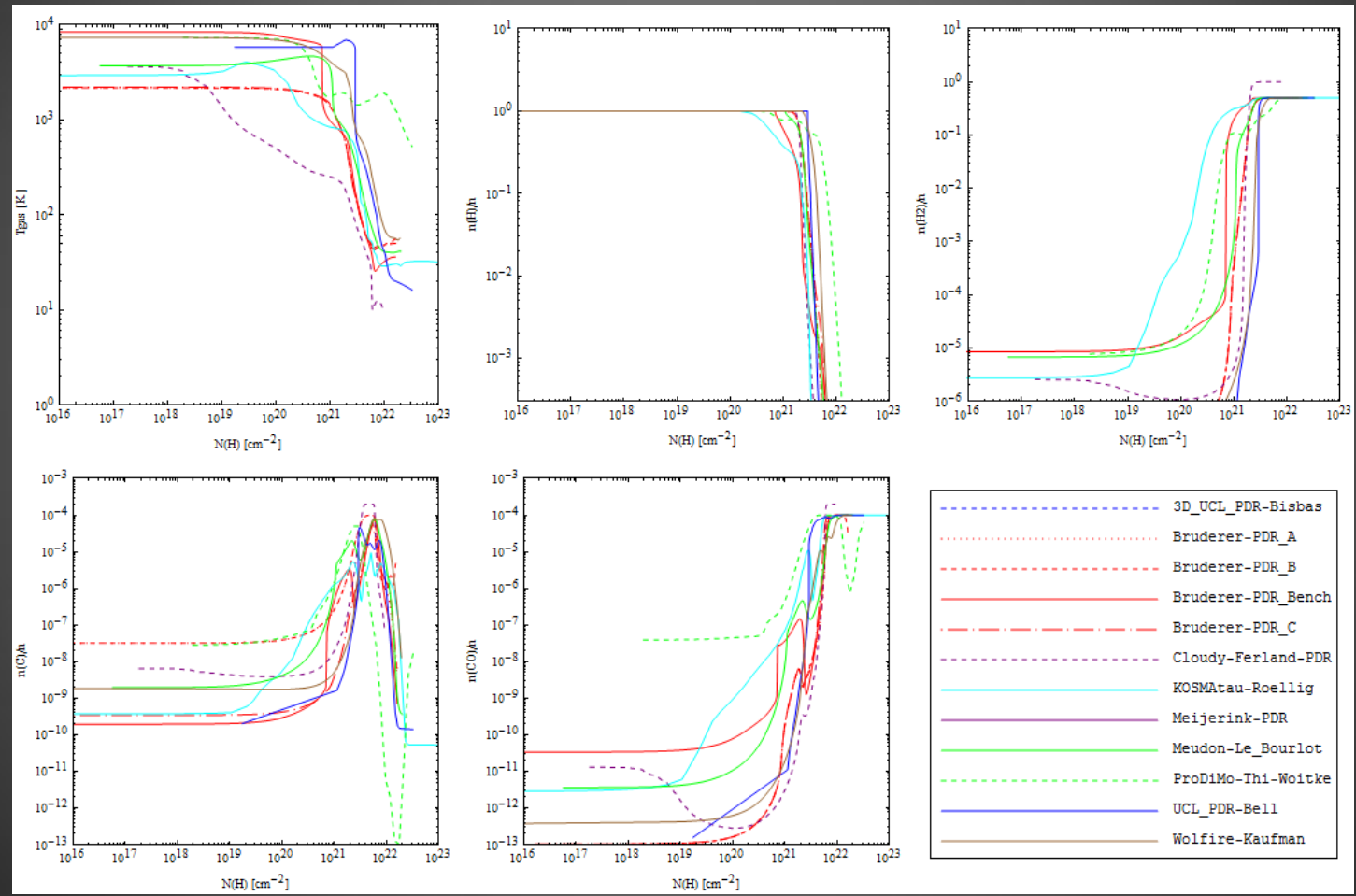
Starting Point PDR-2 ($n=10^3, \chi=10^5$)



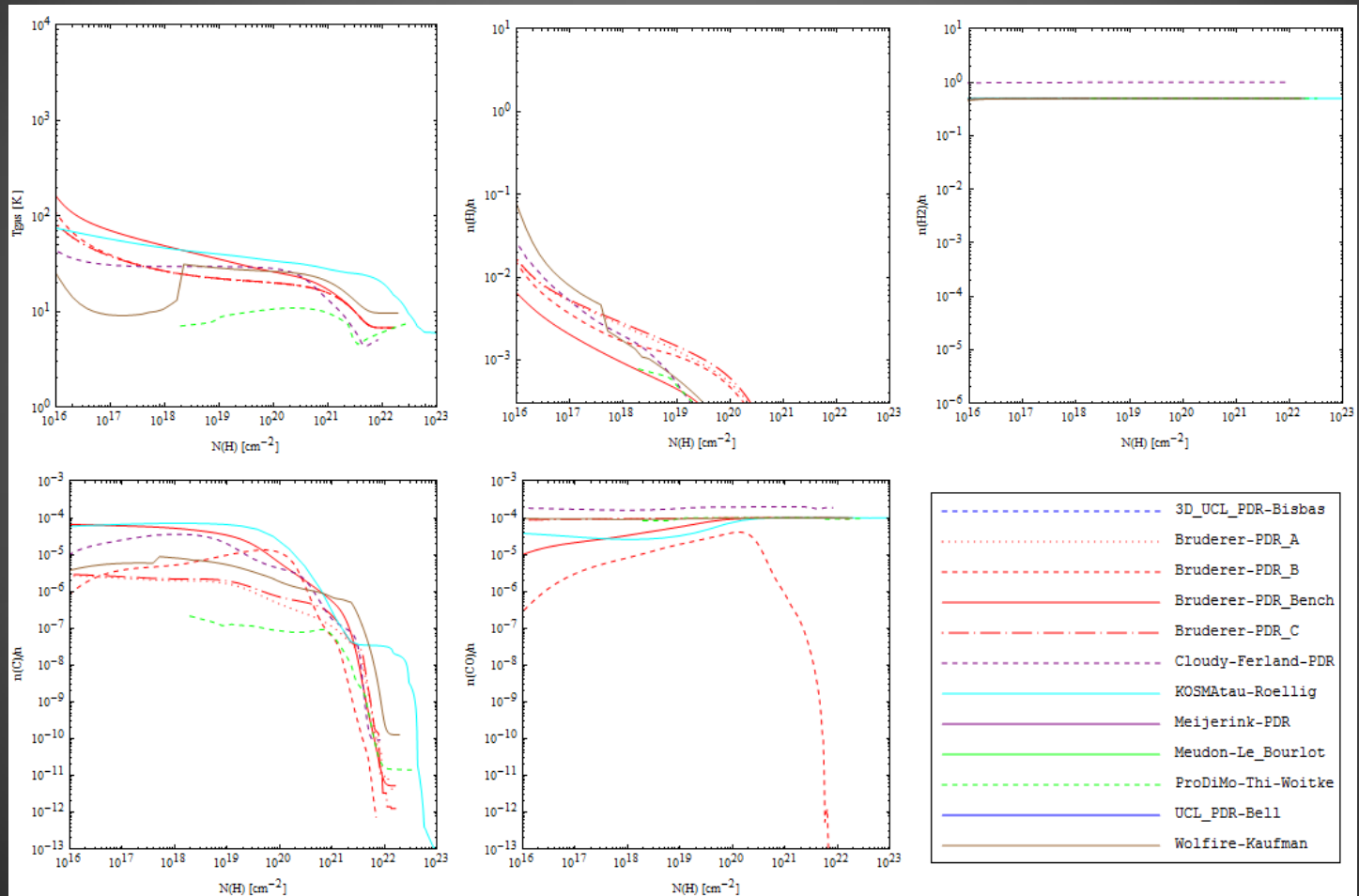
Starting Point PDR-3 ($n=10^{5.5}$, $\chi=10$)



Starting Point PDR-4 ($n=10^{5.5}, \chi=10^5$)

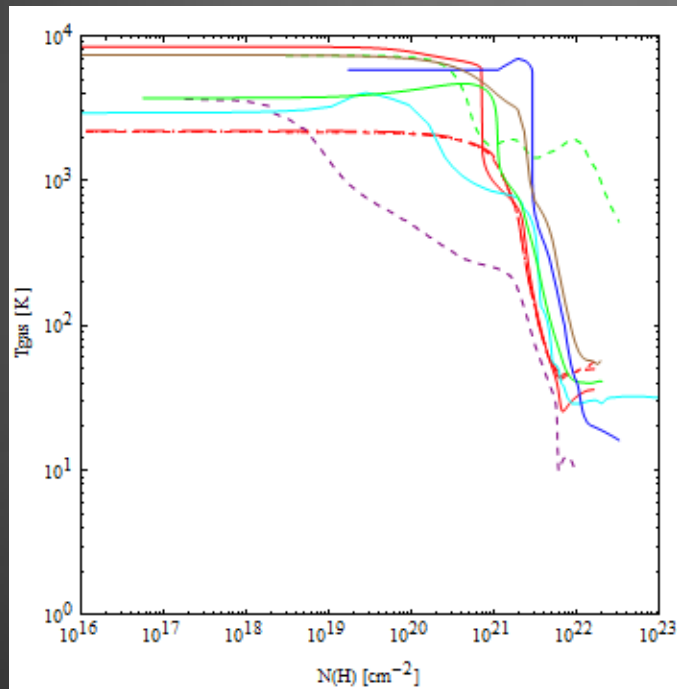


Starting Point PDR-5 ($n=10^7, \chi=10$)

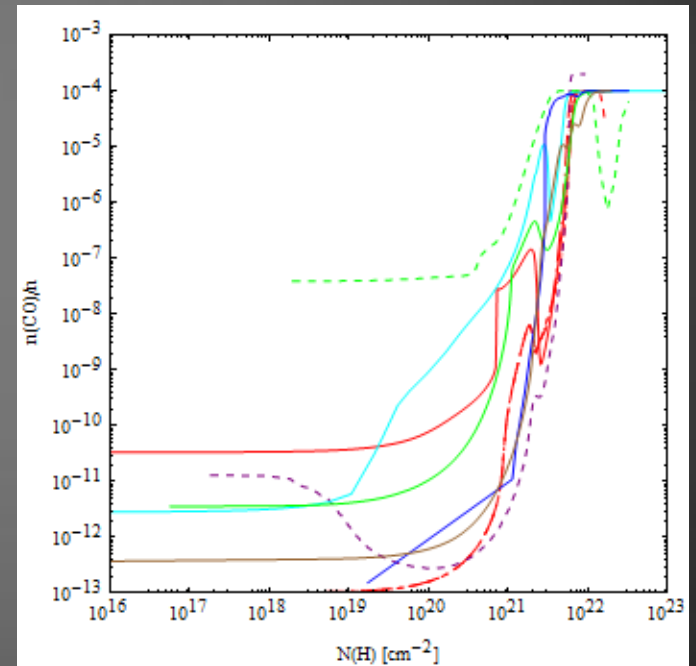


PDR 4, high n, high FUV

T_{gas}

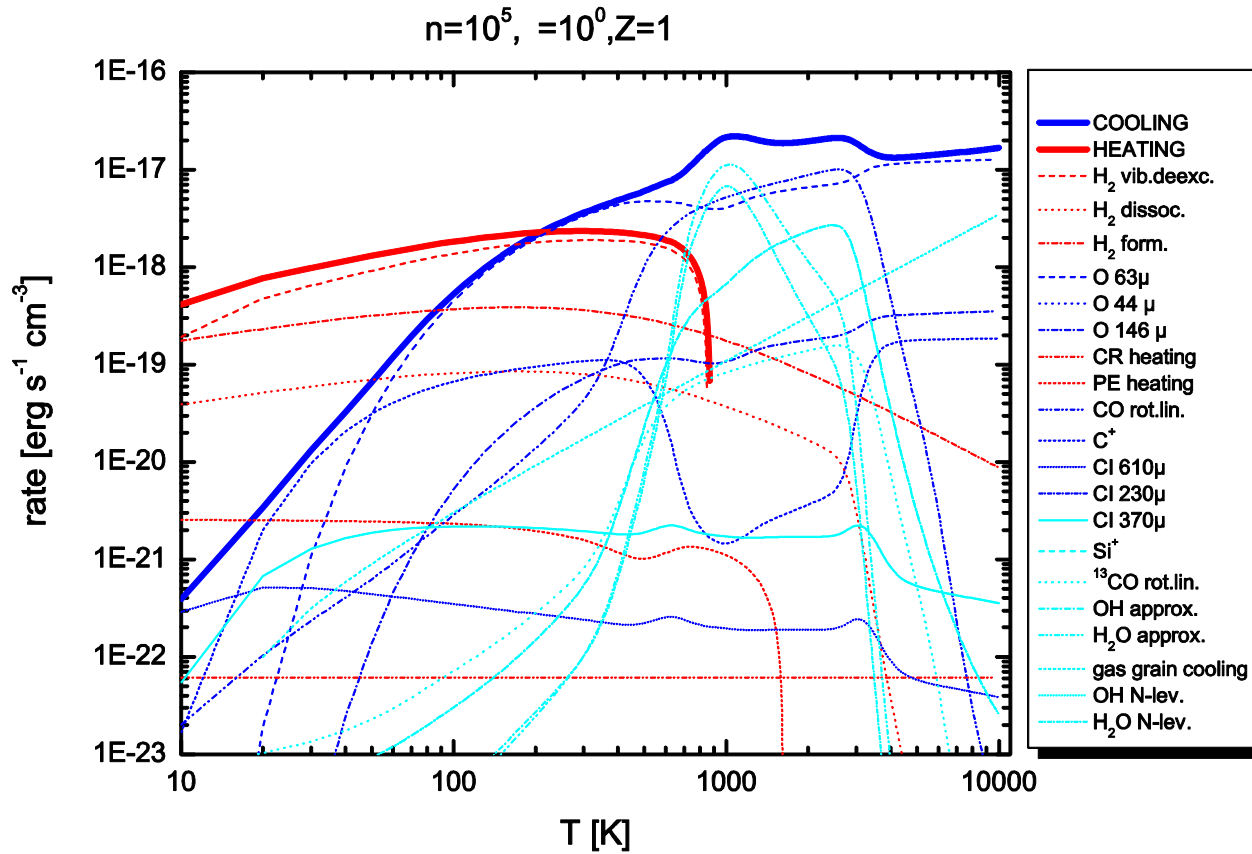


$n(\text{CO})$

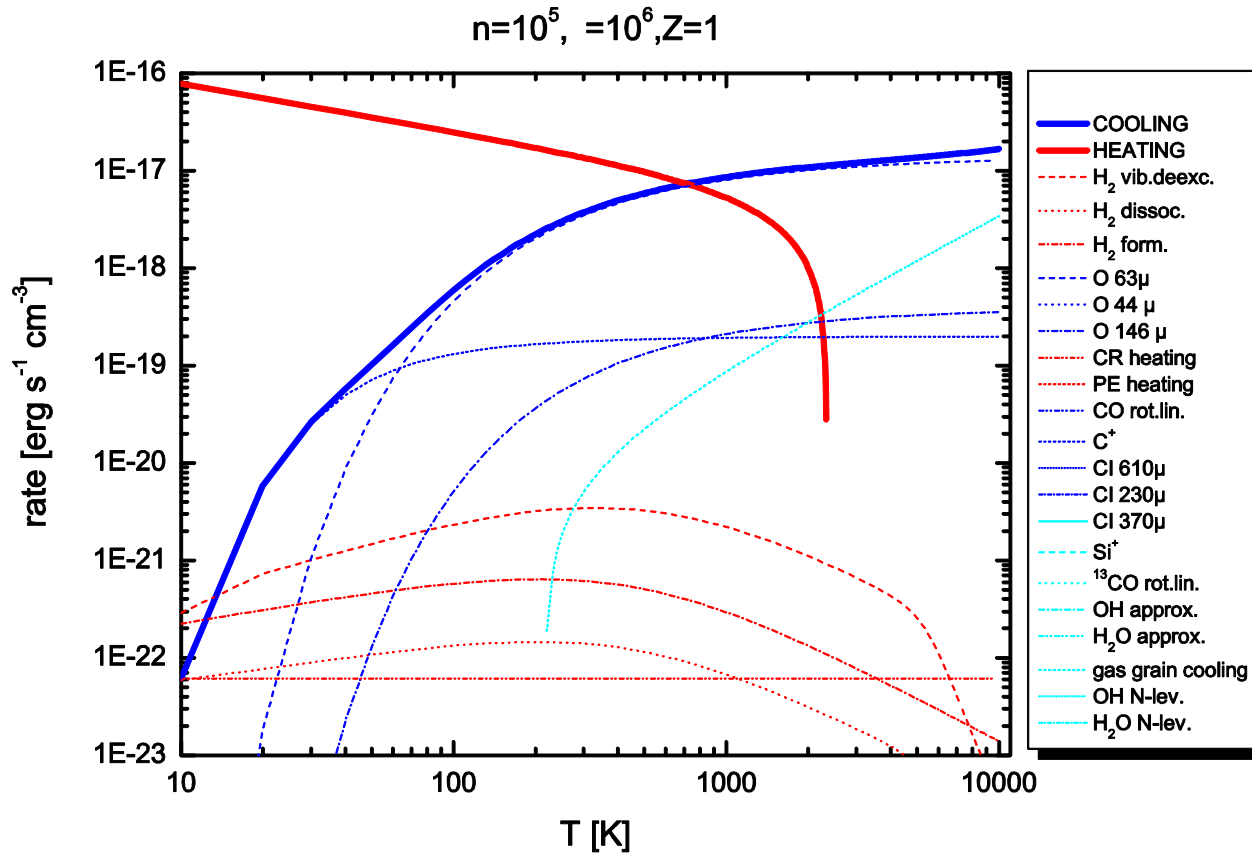


Large model scatter looks scary, but model assumptions were vastly different.

Heating/Cooling

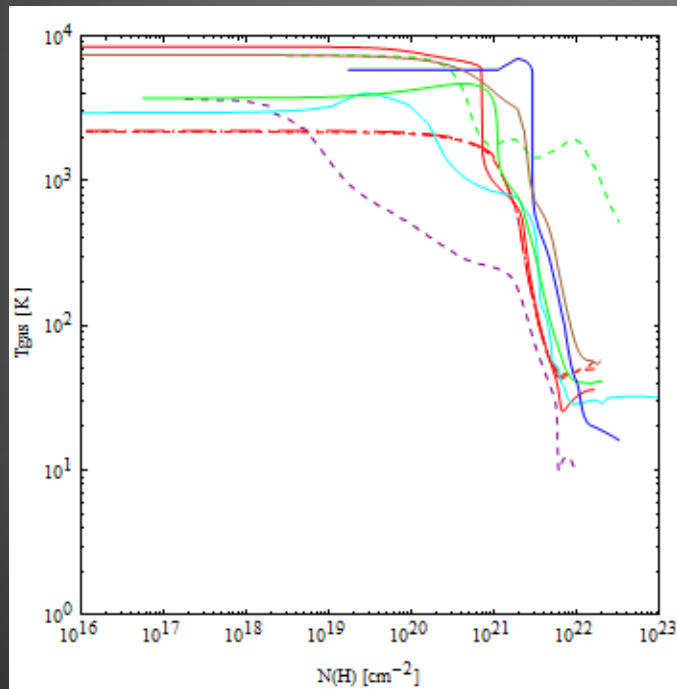


Heating/Cooling

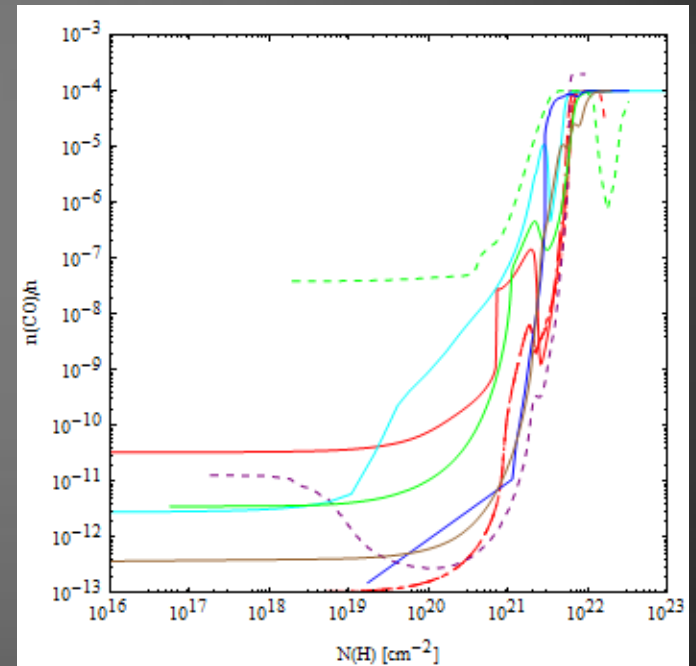


PDR 4, high n, high FUV

T_{gas}



$n(\text{CO})$

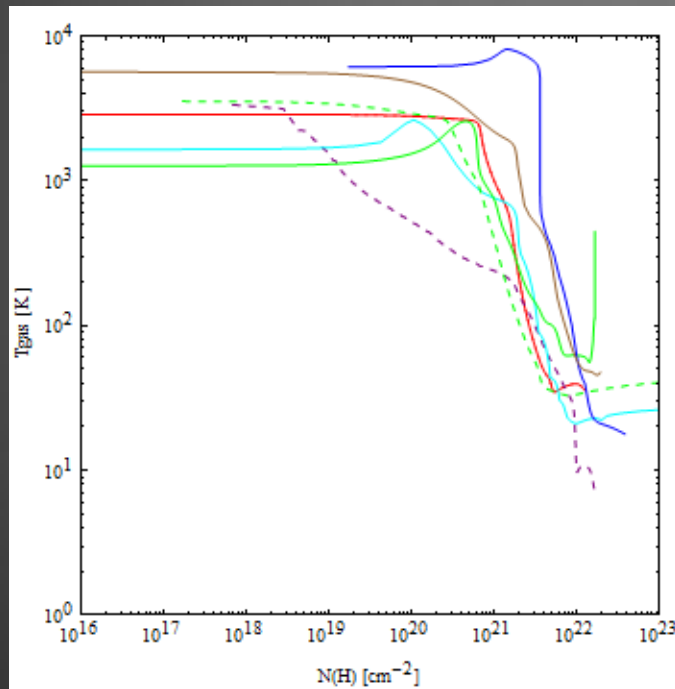


During the workshop we concentrate on the „true“ PDR case #4, and try to understand the differences

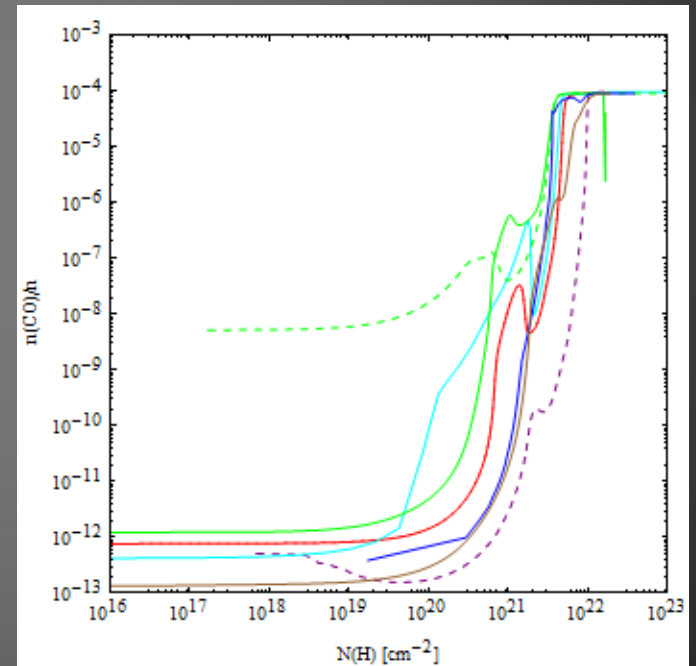
PDR 4, high n, high FUV

NEW

T_{gas}



$n(\text{CO})$

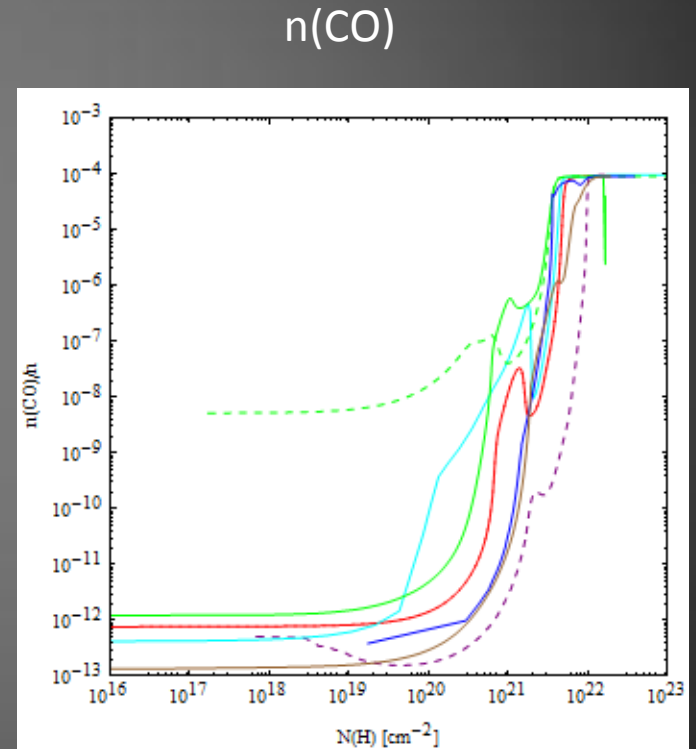
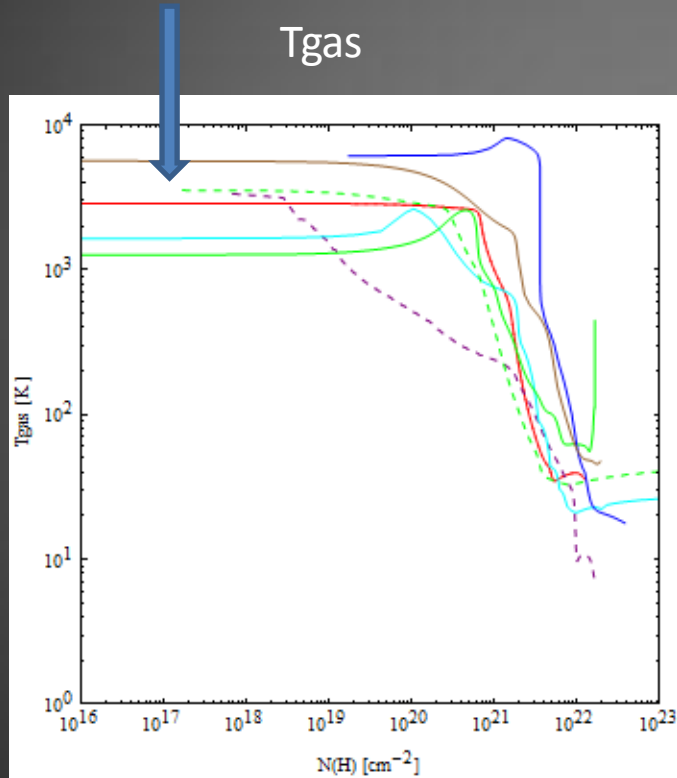


During the workshop we concentrate on the „true“ PDR case #4, and try to understand the differences

PDR 4, high n, high FUV

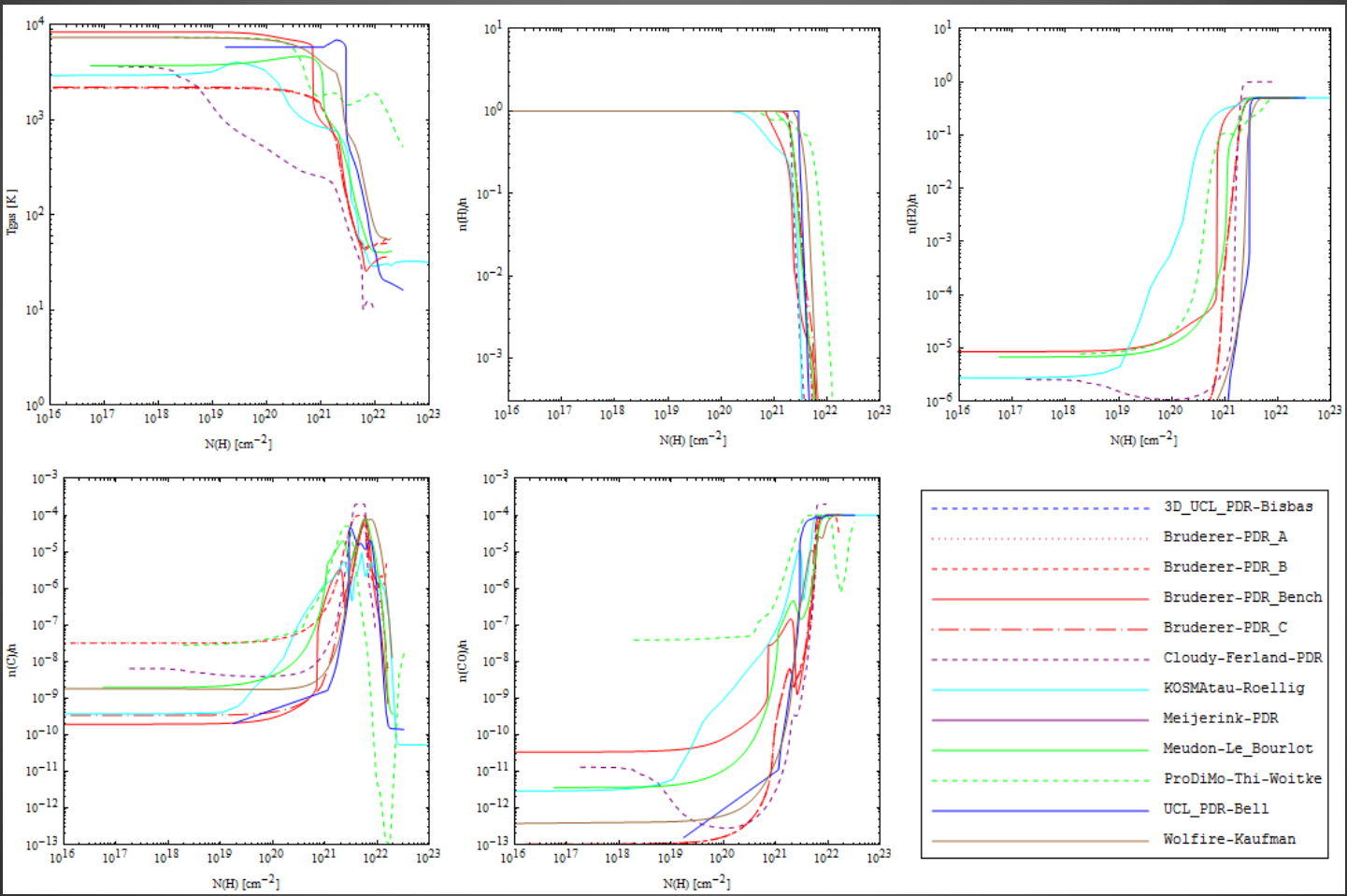
NEW

PE Heating, H₂ formation heating
Dust content



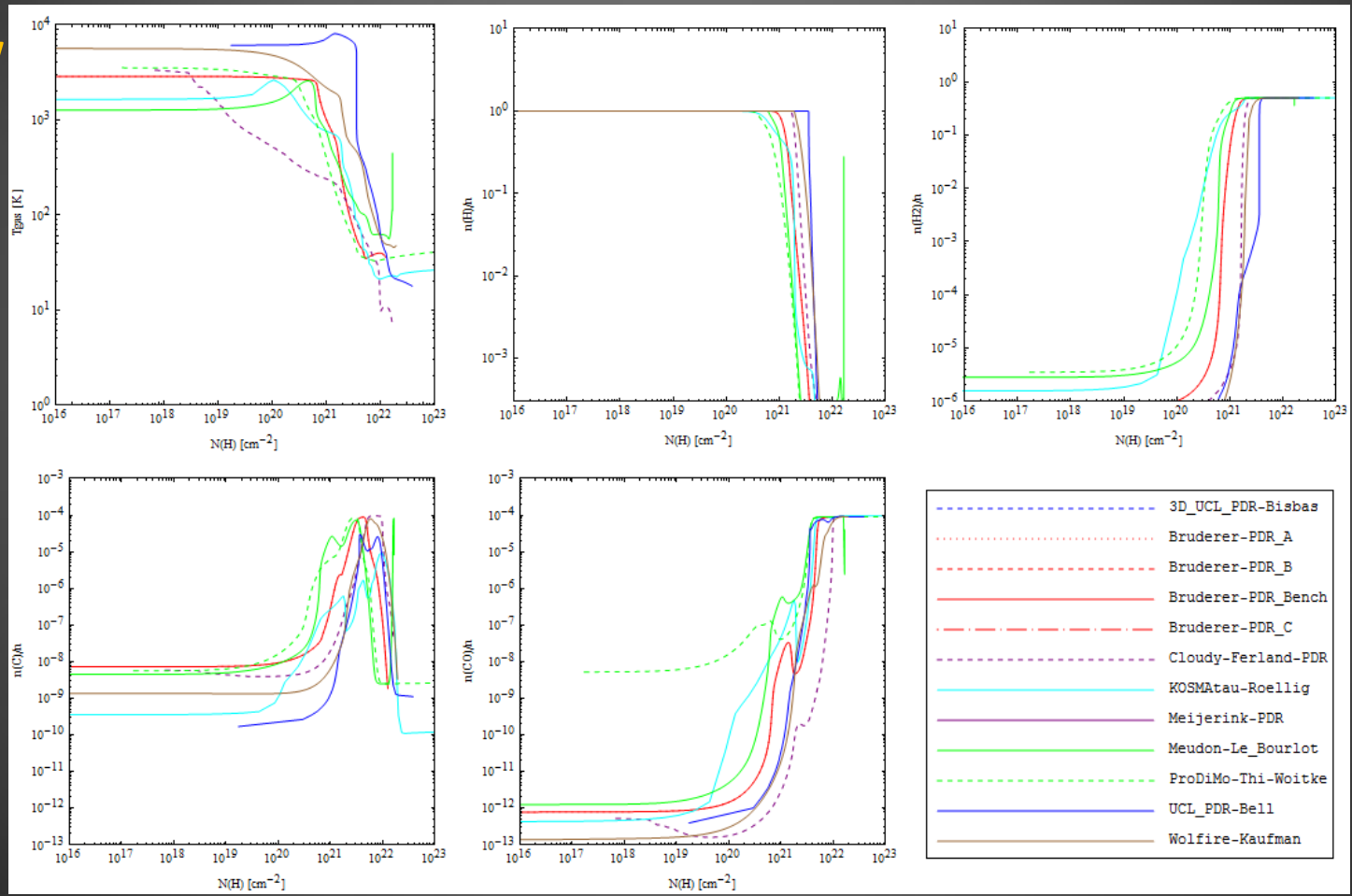
During the workshop we concentrate on the „true“ PDR case #4, and try to understand the differences

Starting Point PDR-4 ($n=10^{5.5}, \chi=10^5$)

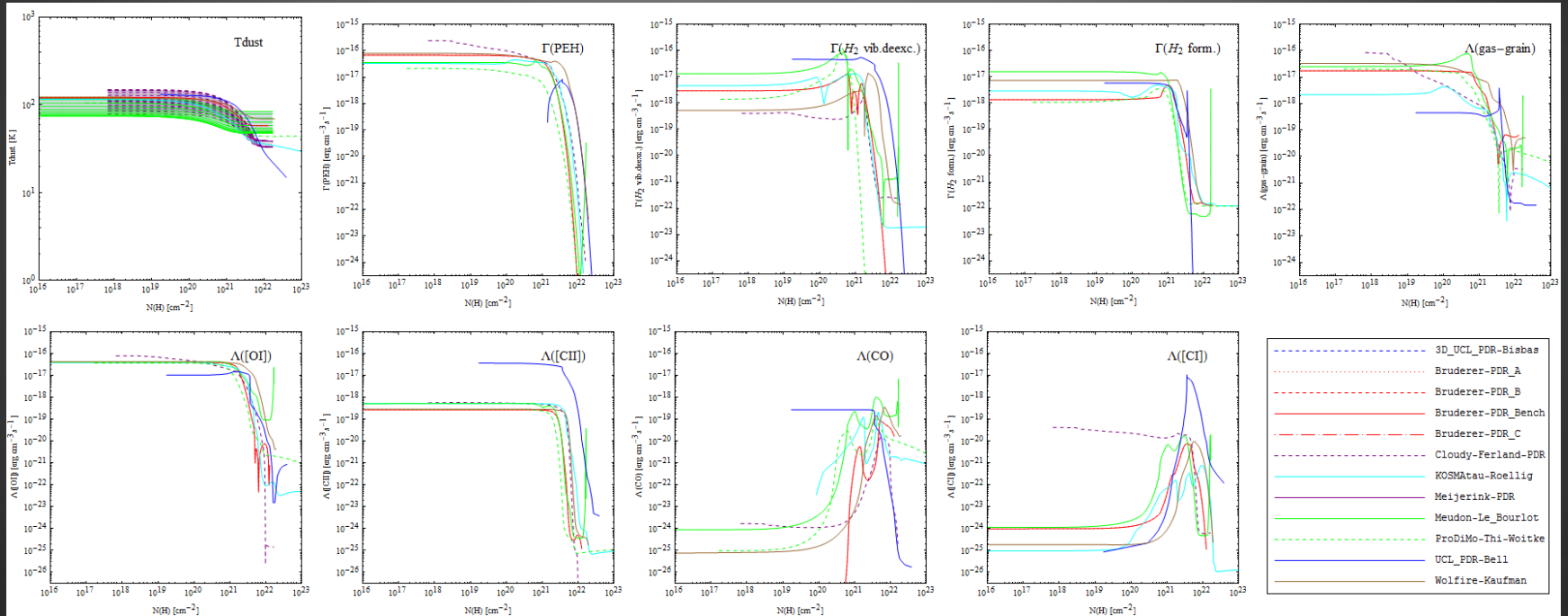


Starting Point PDR-4 ($n=10^{5.5}$, $\chi=10^5$)

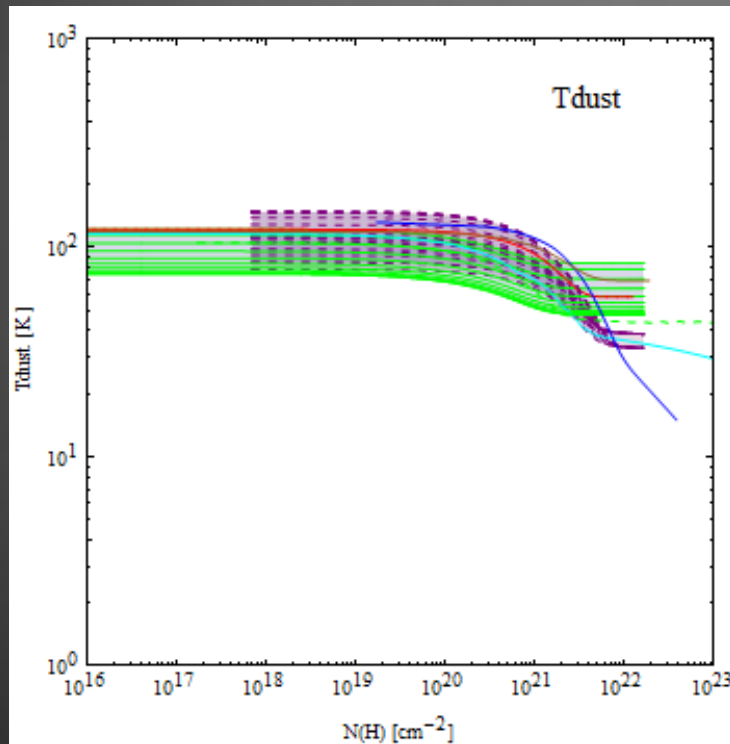
NEW



Additional Information

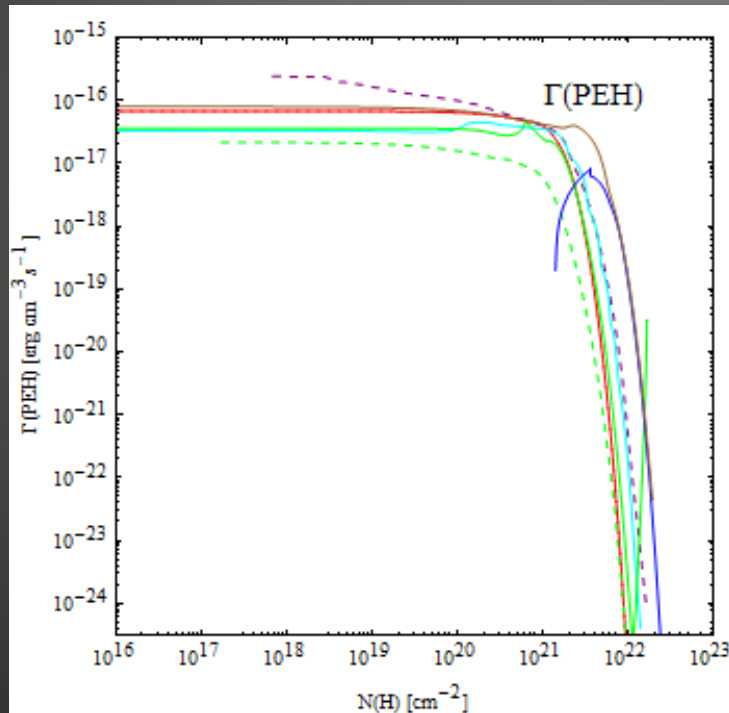


Additional Information



- Dust temperatures appear consistent
- Temperature range for grain size distributions comparable
- Relatively hot dust throughout the whole cloud!

Additional Information

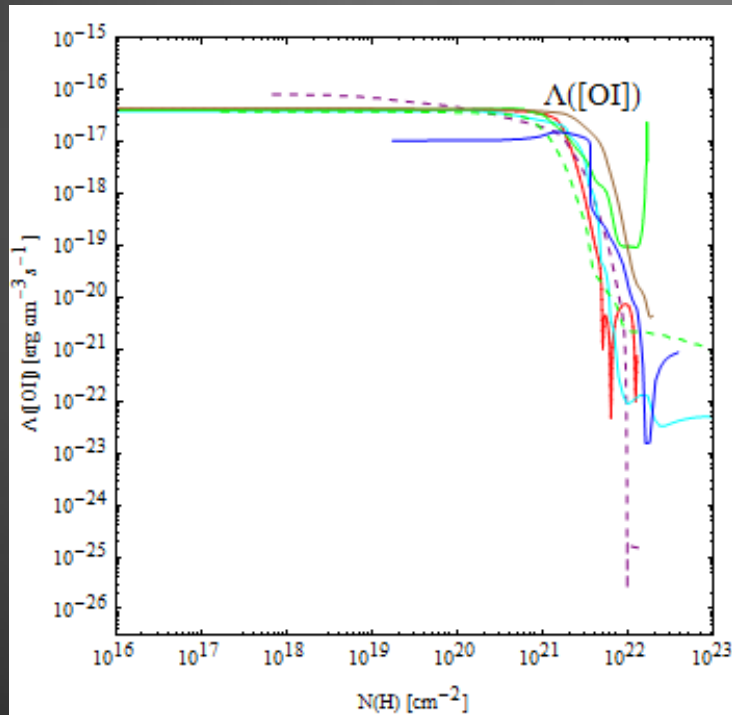


- Major heating through photo-electric heating
- NO PAHs !
- Differences remain (FUV field?, electron density, ...)

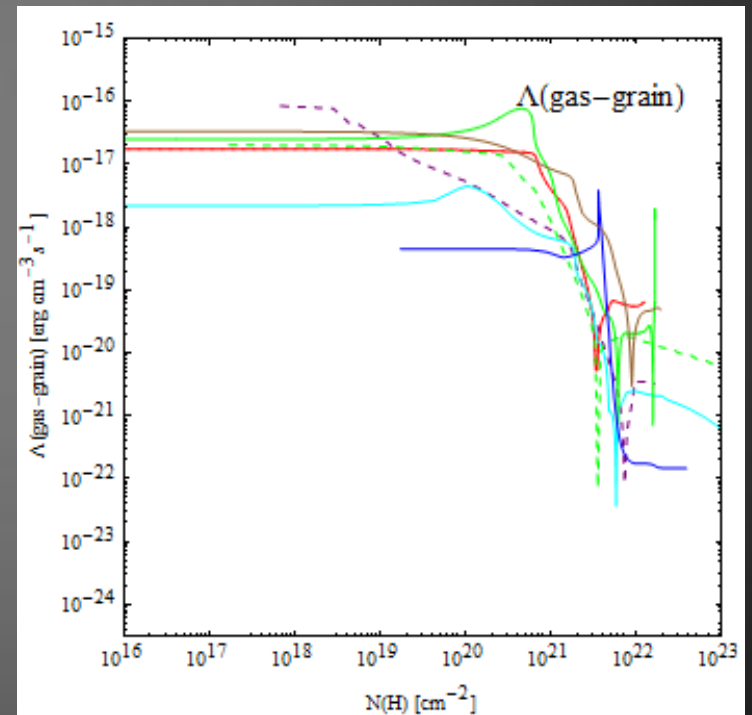
Additional Information

Major coolants

[OI]



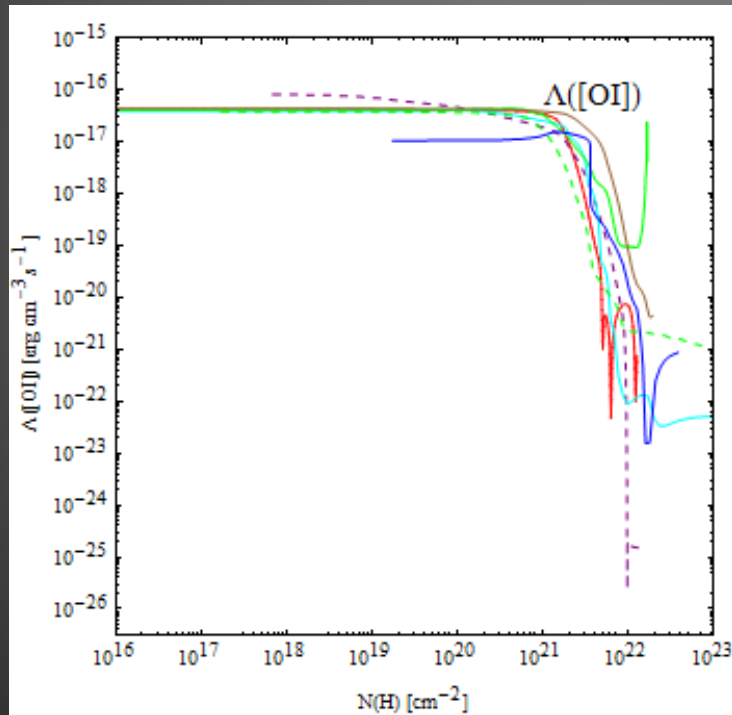
gas-grain collision



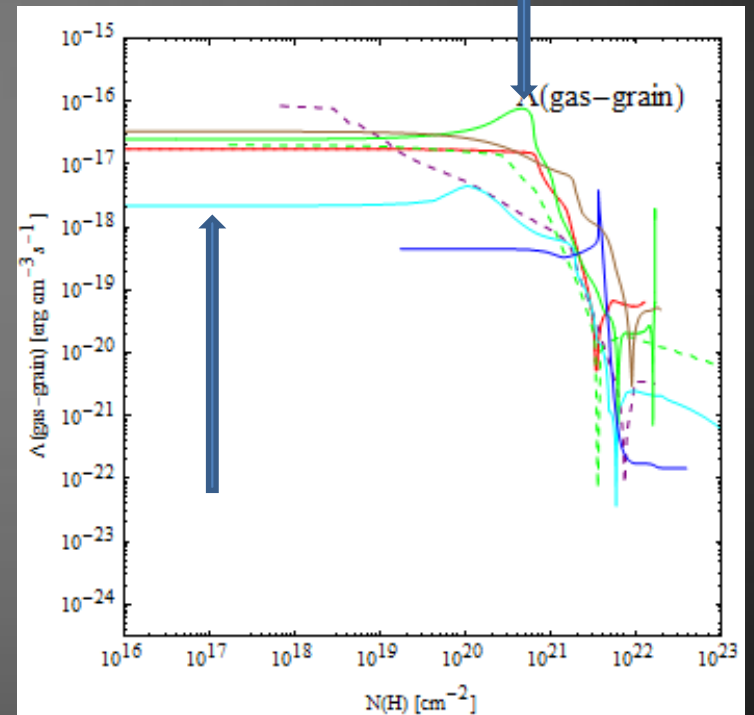
Additional Information

Major coolants

[OI]



gas-grain collision



Summary

- Given the complexity of the various codes and the vagueness of the benchmark (round 2) specifics the convergence of the results is still remarkable.
- No new major heating/cooling process candidate
- Major processes are :
 - Dust physics
 - H₂ formation
 - FUV??
- But their details remain to be investigated