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## Simulating the cosmic distribution of neutral hydrogen and its connection with galaxies

Rahmati, A.

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**Author:** Rahmati, Alireza

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# Propositions

associated with the thesis

## Simulating the cosmic distribution of neutral hydrogen and its connection with galaxies

1. The combination of cosmological simulations and radiative transfer calculations can accurately reproduce the observed HI column density distribution function, and its weak evolution at high column densities (i.e.,  $N_{\text{HI}} \geq 10^{17} \text{ cm}^{-2}$ ).  
*Chapter 2*
2. Local stellar radiation significantly changes the HI column density distribution of Lyman Limit systems at  $z \geq 3$ , and is always important for Damped Ly $\alpha$  systems with  $N_{\text{HI}} \geq 10^{21} \text{ cm}^{-2}$ .  
*Chapter 3*
3. The unresolved small-scale structure of the interstellar medium in cosmological simulations makes the modeling of strong Damped Ly $\alpha$  systems (i.e.,  $N_{\text{HI}} \geq 10^{21} \text{ cm}^{-2}$ ) very challenging.  
*Chapter 3*
4. Most Lyman Limit and Damped Ly $\alpha$  systems at  $z = 3$  are closely associated with extremely low-mass galaxies which are undetectable in current observations.  
*Chapter 4*
5. Simple phenomenological models that reproduce the observed source counts at a wide range of infrared wavelengths require the typical dust temperature of observed infrared galaxies to decrease with redshift.  
*Chapter 5*
6. Identifying feedback processes and unraveling how they regulate galaxies, is the past, present and future of galaxy studies.
7. Studying the distribution of various elements in and around galaxies is key for understanding feedback processes in galaxy formation.
8. Scientific data should be publicly accessible immediately after collection, with no exception.
9. It should be compulsory to indicate the contribution of each author to papers with multiple co-authors.
10. Laziness is a powerful tool for a good scientist, but only if it is combined with perfectionism and a passion for research.
11. Nearly two months of allowed holidays per year is too much for Ph.D. students.
12. The difficulty of becoming/being a scientist depends strongly on nationality.
13. Dark matter is boring, the rest is a mess.

A. Rahmati,  
Leiden, August 2013.