The evolution of the atomic and molecular interstellar medium in star-forming galaxies

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Propositions

accompanying the dissertation

The evolution of the atomic and molecular interstellar medium in star-forming galaxies

1. The decrease in star-formation activity of our Universe in the last 10 Billion years is driven by a decrease of gas content and molecular fraction in galaxies. (Chapters 2, 3, 5, 6)

2. Competition between accretion, consumption, and removal of gas in galaxies is won by consumption and removal at $z < 2$. (Chapter 2, 3, 5, 6)

3. The H I content of galaxies and of our Universe remained relatively constant since $z = 2$, whereas the H_2 content decreased by over an order of magnitude during the same epoch. (Chapter 3, 6)

4. The difference in galaxy evolution between a pressure- and a metallicity-based prescription for the molecular fraction of cold gas in galaxies mostly reveals itself in low-mass haloes and in the cosmic density of H I. (Chapter 3)

5. The excitation conditions of gas in normal star-forming galaxies change with star-formation activity and cosmic time. (Chapter 4)

6. To observe the evolving excitation conditions of cold gas in galaxies, one should focus on tracers of high-density regions. (Chapter 4)

7. The molecular gas content of galaxies peaks in haloes with masses around $10^{12}\,M_\odot$. This drives the high star-formation efficiencies of galaxies with similar halo masses. (Chapter 6)

8. Due to their computational speed and flexibility, SAMS are an excellent tool to study our Universe.

9. Although Schiermonnikoog is the darkest place in the Netherlands, it would be even more useful for astrophotography if they would switch off the lighthouse.

10. In order to become autonomous, you have to be treated as autonomous.

11. Geocaching is using multi-million euro satellites to find a tupperware box in the woods.

12. Not all men who dance ballet are homosexual, but they are all in touch with their feminine side.

Gergö Popping, September 2014