Contribution ID: **10** Type: **Oral**

Theoretical Models of Galaxy Formation including HI - 15'

Wednesday 5 December 2018 14:40 (15 minutes)

In my talk, I will present results obtained using the state-of-the-art galaxy formation model GAEA, and its most recent version including prescriptions to partition the cold gas into its atomic and molecular components (Xie et al. 2017 - X17).

I will first discuss how the most recent observational measurements available for HI selected galaxies in the local Universe compare with prescriptions from six independently developed semi-analytic models (all run on the same cosmological N-body simulation, with X17 being the only one including an explicit treatment for the partition of cold gas in HI and H2).
I will show that the specific treatment adopted for satellite galaxies strongly affects the final HI content at low masses but that, contrary to naive expectations, instantaneous stripping of hot gas from infalling galaxies does not translate necessarily in lower HI masses.
In fact, I will demonstrate that stellar feedback and star formation can influence significantly the gas content of satellites.
Finally, I will discuss the origin of the correlation between HI content of model galaxies and the spin of the parent halos.

In the second part of my talk, I will focus on X17 and on its specific predictions for the sizes and specific angular momenta (j_*) of galaxies.
Our model includes an explicit treatment for specific angular momentum exchange between galactic components, and the scale radii of the gaseous and stellar disks depend directly on their specific angular momenta.
I will discuss how model predictions compare with recent observational estimates, and how they are affected by different prescriptions for cold gas accretion and stellar feedback.

The results I will present show that the X17 model is able to reproduce both the HI content and the dynamical properties of simulated galaxies, representing an ideal tool to create dedicated mock catalogues for the interpretation of existing surveys and the preparation of future ones.
We have developed a dedicated software to this aim.
A first preliminary all sky mock catalog has already been made available to the SKA cosmology group working on intensity mapping.
We plan to expand this work by extending this catalog up to higher redshift and including the 21 cm line emission of model galaxies.
We plan to make the catalogues available to the larger SKA community.

The results I will present have been published in Zoldan et al. (2017) and Zoldan et al. (2018).

Author: ZOLDAN, Anna (OATS - INAF)

Co-authors: Dr DE LUCIA, Gabriella (OATS - INAF); Dr FONTANOT, Fabio (OATS - INAF); XIE, Lizhi; HIRSCHMANN, Michaela

Presenter: ZOLDAN, Anna (OATS - INAF)

Session Classification: Science with SKA Precursors and Pathfinders