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Galaxy Bias in Illustris Simulations

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The galaxy distribution on large scales is not uniform, it follows a web-like pattern known as the cosmic-web. This pattern can be completely explained by the galaxies forming inside of dark matter halos. Therefore, the galaxy distribution can be related to the underlying dark matter distribution. This relationship, known as galaxy bias, can be used to understand the varied physics process of galaxy formation and probe the Dark Matter distribution. The purpose of this work is to understand how the cosmic web influences the galaxy bias. To this end, we use data from state-of-the-art hydrodynamical simulations (Illustris and Illustris-TNG). To perform and analysis on a wide range of galaxies masses spanning a mass range from $10^8 M_{\odot}/h$ to $10^{13} M_{\odot}/h$. Our preliminary results show that, at fixed mass, galaxies that form early tend to be located in cosmic-web environments with higher anisotropy than its late-forming counterparts, thus demonstrating the influence of the cosmic web on the galaxy formation bias.

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