

Title: Where are the CGM systems in the Lyman-alpha forest?

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Abstract: The circumgalactic medium (CGM) is the bridge between galaxies and the intergalactic medium (IGM), where the interplay between galaxies and the IGM regulates most of the physical processes in the history of the Universe, from star-formation to mass accretion. Comprehending the multiphase medium that is the CGM is therefore crucial to help us develop a better understanding of the Universe.

When we think of studying the CGM in the Lyman- α forest we normally think of Damped Lyman- α , Lyman limit systems, or even partial Lyman limit systems, however, simulations tell us that most of the CGM by volume is optically thin to ionising photons. Conversely when we study the Lyman- α forest we have been unaware of where these CGM systems and their associated feedback process have been lurking. We estimate that there are orders of magnitude more galaxies in absorption associated with optically thin Lyman- α forest systems than the typically studies optically thick (Lyman limit systems).

We will present the study of this large population of CGM systems as Strong Blended Lyman-Alpha (SBLA) initially identified SDSS quasar absorption spectra (Pieri et al. 2010, 2014 and Morrison et al. 2023) using IllustrisTNG and next generation surveys. We will show insights into their identification from simulations and present the challenge to the simulation community of reproducing the physical properties of this gas.