

The impact of supernovae on the simulated CGM: insights from quasar absorption lines.

The study of galaxy formation and evolution has progressed significantly in recent decades, with numerical simulations producing galaxies matching observed properties. However, the inner workings of the feedback processes that regulate the growth of galaxies are not fully understood. To address this, a new generation of high-resolution simulations has been developed, using subgrid models to describe unresolved phenomena at the resolution scale. While these simulations can produce galaxies comparable to observations, there is a degeneracy between subgrid models which can only be lifted by an observable beyond galactic properties. We thus turn a medium both challenging to model and sensitive to feedback, the circum-galactic medium (CGM). In this talk, I present the results of a series of zoom-in cosmological simulations of the same galaxy using different subgrid models. I will first demonstrate how different subgrid models can produce galaxies with similar stellar masses, but distinct CGM. Then, I will show that even though an underlying degeneracy can be sustained between models, they can be fully differentiated by relying on column densities. Finally, I will show how such simulations compare to observations, and present keys to reach a better agreement between simulations and observations.