Intrinsic Alignment and Cosmic Shear

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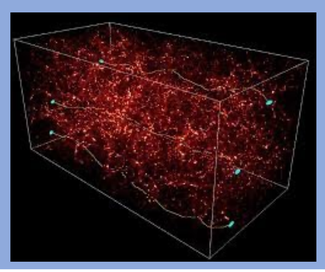
PURM
Penn Undergraduate Research Mentoring Program

Conclusion

It appears from our results that angular momentum-derived shear-shear correlations are the most sizable, especially at longer distances, which would cover galaxies in different clusters.

This result suggests that the best way to understand the intrinsic alignment between halos is via the orientation of their spin vectors, which implies that the best conserved value from the early universe still observable in halos is their inertia.

Above: A spiral galaxy with angular momentum vector displayed
Below: A lightbox, a discrete area of the universe like the one used in this project



Introduction

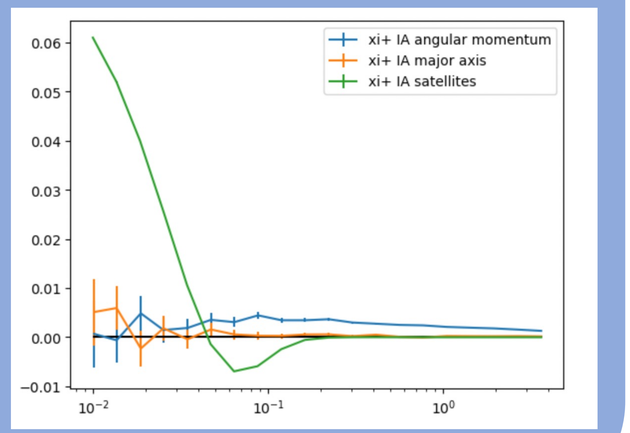
Intrinsic alignment (IA) is an effect in the formation of galaxies and galaxy clusters, caused by factors present in the early universe.

Methods

In this experiment, we analyzed the shear-shear correlations between galaxies simulated based on a dark matter halo catalog. We used three metrics to derive the IA: Angular momentum, major axis orientation, and the placement of satellite galaxies

Results

Below is a graph of the positive xi-xi correlations for the three methods. To the right are xi+ and xi- graphs that have been scaled by distance.



Discussion of Results

The large correlations between satellite galaxies at short distances is because they are co-generated within the same halos. The largest result is the derivation from angular momentum, especially visible in the scaled graph