

# Preparing for WAVES: Evaluating Galaxy Group-Finders with Shark v2 Mock Catalogues

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The Wide Area Vista Extragalactic Survey (WAVES) is part of a suite of ambitious surveys utilizing the dedicated 4-meter Multi-Object Spectrograph (4MOST) in Chile. WAVES aims to measure the redshifts of 1.7 million galaxies and is scheduled to launch in December 2025. These next-generation redshift surveys are essential for probing the large-scale structure of the universe, offering unparalleled insight into the distribution of galaxies, clusters, and filaments. Identifying and analyzing these structures in a consistent and robust way is crucial for fully leveraging the data these surveys will produce.

A key method for studying large-scale structure is through galaxy group identification using group-finding algorithms, such as the widely used friends-of-friends and halo-based methods. However, the variety of group finders now available—each tailored to different surveys—raises questions about their comparative performance. In this talk, I present a systematic comparison of the most well-known group-finding algorithms by running them on realistic mock catalogues built using the Shark v2 semi-analytical model. Additionally, I discuss the work of the WAVES structure-finding technical working group and highlight the data products that will be made available to the scientific community.

The identification of galaxy groups is closely tied to the study of peculiar velocities, as these velocities are influenced by the gravitational potential of large-scale structures. By identifying galaxy groups, WAVES will contribute valuable information to the broader study of peculiar velocities, enabling the refinement of cosmic flow models and enhancing our understanding of the dark matter distribution in the local universe.

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