

Modern Measurements of Merger Morphologies

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In the current model of galaxy evolution, mergers play a key role in driving the mass build-up of galaxies as well as triggering active galactic and starbursts. Identifying galaxy mergers in large datasets is a difficult task due to their irregular and highly dynamic morphologies. In this seminar I will discuss some of the most common methods for identifying galaxy mergers through visual methods, statistical approaches, kinematics, and machine learning.

I will then discuss some of the early results from my PhD research starting with a review of how morphologies are quantified. These early results compare statistical merger classifiers to a suite of machine learning methods developed by Margalef-Bentabol et al. 2024. For this project, a Monte-Carlo Markov Chain was used to optimise the classifier performance. I will show that statistical techniques can achieve similar precision to machine learning methods but lack completeness in their merger classifications. In future work, unsupervised learning may be used to improve the completeness of these classifications to produce a highly efficient and reliable merger classifier for use on large surveys.

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