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Finding colliding galaxies in big data

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In the ΛCDM cosmological model, the evolution and mass build-up of galaxies is highly influenced by mergers. Key processes, such as starbursts and active galactic nuclei, along with major morphological changes are triggered by mergers. In order to effectively study their role in the era of peta-byte scale galaxy surveys, efficient and reliable methods for identifying galactic mergers are essential. In this seminar I will review the most common methods of classifying mergers in order to provide context for my work on designing updated and novel identification techniques. This review will have a focus on the application of non-parametric morphological statistics which are a core aspect of my thesis. Using a set of HSC style mock images from the IllustrisTNG suite of simulations, I will benchmark the performance of statistical merger classification techniques against state-of-the-art machine learning methods. This analysis sets the stage for ongoing work developing new statistics to better classify merging galaxies in upcoming surveys such as Euclid and LSST.

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