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Identifying galaxy mergers and their effect on star formation rates

Galaxy mergers underpin our current understanding of how galaxies grow and evolve. In the current CDM models, dark matter halos merge hierarchically resulting in the collision between their baryonic counterparts. During these mergers the galaxies are disrupted, with the tidal forces twisting and distorting them, moving the stars, dust and gas and changing morphologies. This movement of material can also trigger extreme events, with gas pushed into the centre of the galaxies triggering active galactic nuclei and the compression of the gas triggering periods of intense star formation. Despite approximately 10% of galaxies being observed to be undergoing a merger, statistical studies of galaxy mergers are hampered by the difficulty in detecting these events.

In this talk I will discuss ways we can improve our merger detection methods in the era of large data in astronomy. Using deep learning we will see how we can rapidly identify large numbers of merging galaxies, an order of magnitude more than in previous studies. I will also explore how we can use cosmological simulations to augment, or potentially replace, observational training data needed for deep learning. With the large sample of merging galaxies now available, the talk will move on to discuss how galaxy mergers influence star formation rates at a statistical level, when compared to non-merging counterparts.

Serdecznie zapraszam,
Agnieszka Majczyna