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Unravelling galaxy merger histories with deep learning

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Mergers between galaxies can be drivers of morphological transformation and various physical phenomena, including star-formation, black-hole accretion, and chemical redistribution. These effects are seen clearly among galaxies that are currently interacting (pairs) – which can be selected with high purity spectroscopically with correctable completeness. Galaxies in the merger remnant phase (post-mergers) exhibit some of the strongest changes, but are more elusive because identification must rely on the remnant properties alone. I will present results from my recent paper combining images and stellar kinematics to identify merger remnants using deep learning (arXiv:2201.03579). I show that kinematics are not the smoking-gun for improving remnant classification purity and that high posterior purity remains a significant challenge for remnant identification in the local Universe. However, an alternative approach which treats all galaxies as merger remnants and reframes the problem as an image-based deep regression yields exciting results.

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