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The alignment of galaxies across all scales

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Propositions accompanying the thesis

The alignment of galaxies across all scales

1. The intrinsic alignment of galaxies depend on the wavelength of observations, with a higher signal observed in the g and i -band filters compared to the r -band. This difference is primarily sourced by the red satellite galaxies in the galaxy sample (Chapter 2).
2. Using informative priors for the amplitude of intrinsic alignments, taken from flux limited samples, when measuring cosmic shear can significantly reduce the error on the inferred cosmological parameters (Chapter 3).
3. Satellite galaxies are radially aligned with their group halo in galaxy groups. The alignment is stronger on the outer regions of satellites and red satellites are more strongly aligned than blue (Chapter 4).
4. Central galaxy shapes are aligned with the position of their satellite galaxies in galaxy groups. The alignment is stronger with the satellites closer to the group's centre, and also with the shape of the outer regions of the central galaxies; the latter behaviour is not strongly evidenced when considering the alignment among shapes and positions of central galaxies alone (Chapter 4 and 5).
5. Weak gravitational lensing provides a useful and competitive tool with which the properties of dark matter and dark energy can be studied.
6. Galaxy intrinsic alignments on small scales have complex and interesting dependencies, particularly associated with the behaviour of satellite galaxies. Understanding and modelling of the alignment of such galaxies is important for future weak lensing surveys.
7. The dependence of the intrinsic alignment signal on the galaxy scale can be used to further understand the dynamical interactions between galaxies in groups and clusters, as well as the evolution of galaxies.
8. With astronomical surveys conducted by a large number of people, primarily managerial positions should be opened to ensure a smooth and healthy operation of these surveys.
9. Hiring professional software developers in order to construct astronomy focused software would greatly speed up the research in astronomy.
10. The continuous change of working country in the career of an academic can drive off many talented and motivated researchers. The creation of permanent, research focused positions in universities and research institutes would partly solve this problem.
11. Being engaged in activities outside the working environment is of vital importance for the health and balance of employees, and should be encouraged.
12. University research staff members are often selected on their academic merit but are primarily tasked with teaching and supervising duties, for which they are not necessarily trained. This approach is sub-optimal and should be reconsidered.