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Unveiling dark structures with accurate weak lensing

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Propositions accompanying the thesis

Unveiling dark structures with accurate weak lensing

1. When galaxies are stacked, noise bias can largely be avoided and for an unbiased sample of galaxies this scheme can be used to calibrate shape measurement methods which give a shear estimate per galaxy.
(Chapter 2)
2. The creation of realistic simulations of astronomical observations involves many input parameters, which all influence the calibration of the weak lensing measurement to some degree.
(Chapter 3)
3. A correct determination of the relation between the properties of intra cluster gas and weak lensing mass can unlock one of the most powerful tools of observational cosmology.
(Chapter 4)
4. Weak lensing measurements of satellite galaxies can provide valuable information on physical processes in dense environments, but more theoretical and observational work is required before models of hierarchical structure formation can be tested.
(Chapter 5)
5. An inherently biased method, that is calibrated using realistic simulations, should be viewed as the equal of an inherently unbiased method. If the simulations are not realistic, then the method, that is least sensitive to the flawed aspects of the simulations, should be preferred.
6. Industrial scale collaborations will require a fresh look at author lists and the importance of non-first author papers.
7. Investments in computer facilities are necessary to make calibrations of shape measurements with simulated telescope images feasible for the upcoming weak lensing surveys.
8. Writing code from scratch is best done with multiple people, so that any bugs are more easily spotted and at the very least so that the code is readable by more than one person.
9. The era of precision cosmology is a fanciful term to describe a very long time spent performing systematic tests.
10. Although coffee is more plentiful in supply than days without rain, a walk in the fresh air is at least as invigorating as a cup of coffee.
11. It is wondrous and interesting what people want to know from astronomers.

Ricardo Tian Long Herbonnet
Leiden, September 2017