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The current ‘standard model’ of cosmology provides a minimal theoretical framework that can explain the gaussian, nearly scale-invariant density perturbations observed in the CMB to the late time clustering of galaxies. However accepting this framework, requires that we include within our cosmic inventory a vacuum energy that is ~122 orders of magnitude lower than Quantum Mechanical predictions, or alternatively a new scalar field (dark energy) that has negative pressure.

An alternative approach to adding extra components to the Universe would be to modify the equations of Gravity. Although GR is supported by many current observations there are still alternative models that can be considered. Recently there have been many works attempting to test for modified gravity using the large scale clustering of galaxies, ISW, cluster abundance, RSD, 21cm observations, and weak lensing.

In this work, we compare various modified gravity models using cosmic shear data from the Deep Lens Survey as well as data from CMB, SNe Ia, and BAO. We use the Bayesian Evidence to quantify the comparison robustly, which naturally penalizes complex models with weak data support. In this talk we present our methodology and preliminary results that show f(R) gravity is mildly disfavoured by the data.

## [구 CD-03] Constraints on cosmology and baryonic feedback by the combined analysis of weak lensing and galaxy clustering with the Deep Lens Survey

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We constrain cosmological parameters by combining three different power spectra measured from galaxy clustering, galaxy-galaxy lensing, and cosmic shear using the Deep Lens Survey (DLS). Two lens bins (centered at z~0.27 and 0.54) and two source bins (centered at z~0.64, and 1.1) containing more than one million galaxies are selected to measure the power spectra.

We re-calibrate the initial photo-z estimation of the lens bins by matching with SHELS and PRIMUS and confirm its fidelity by measuring a cross-correlation between the bins. We also check the reliability of the lensing signals through the null tests, lens-source flipping and cross shear measurement. Residual systematic errors from photometric redshift and shear calibration uncertainties are marginalized over in the nested sampling during our parameter constraint process.

For the flat LCDM model, we determine S_8=sigma_8(Omega_m/0.3)^0.5=0.832+-0.028, which is in great agreement with the Planck data. We also verify that the two independent constraints from the cosmic shear and the galaxy clustering +galaxy-galaxy lensing measurements are consistent with each other.

To address baryonic feedback effects on small scales, we marginalize over a baryonic feedback parameter, which we are able to constrain with the DLS data alone and more tightly when combined with Planck data. The constrained value hints at the possibility that the AGN feedback in the current OWLS simulations might not be strong enough.

## [구 CD-04] Using the Topology of Large Scale Structure for Cosmological Parameter Estimation

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The Minkowski Functionals of the matter density eld, as traced by galaxies, contain information

regarding the nature of dark energy and the fraction of dark matter in the Universe. In particular, the genus is a statistic that provides a clean measurement of the shape of the linear matter power spectrum. As the genus is a topological quantity, it is insensitive to galaxy bias and gravitational collapse. Furthermore, as it traces the linear matter power spectrum, it is a conserved quantity with redshift. Hence the genus amplitude is a standard population that can be used to test the distance-redshift relation. In this talk, I show how we can extract the genus from galaxy catalogs, and how we can use its properties to constrain the equation of state of dark energy and the energy content of the Universe.

## [구 CD-05] Cosmological Information from the Small-scale Redshift Space Distortions

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