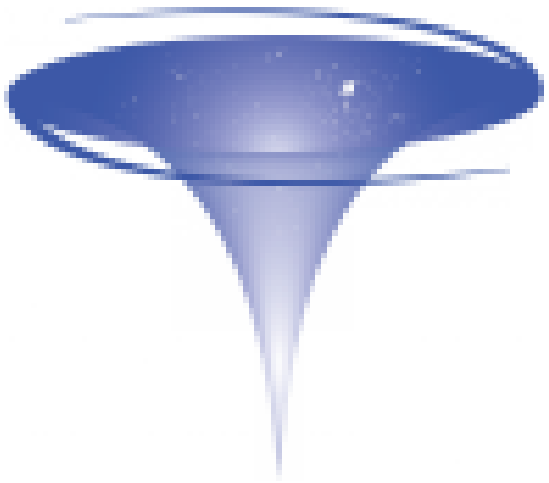
Euclid SPV3 meeting

lundi 20 mars 2023 - jeudi 23 mars 2023

Institut d'Astrophysique de Paris



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PSF modelling for SPV3

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Co-auteur: Chris Duncan [1]

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We describe the status of PSF modelling for SPV3, providing updates and features that may be used in multi-faceted investigations.

Weak Lensing End-2-End box, status and performances / **3**

Testing the impact of scale-dependent multiplicative bias on the cosmological analysis of the 3x2pt statistics for Euclid.

Auteur: Konstantinos Tanidis[1]

Co-auteurs: Casey Cragg [1]; Christopher Duncan [1]; Lance Miller [1]

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In this work, we study the effect of spatially-varying multiplicative bias on the cosmological parameter estimation in the combined photometric analysis of the 3x2pt statistics for a Euclid DR3 end-to-end forecast. To do so, we consider a spin-0 m-bias map characterized by a Gaussian profile angular power spectrum that has been studied in the literature. Also, we proceed with a conservative approach by choosing the most pessimistic scenario that has already been shown to give biased results exceeding the statistical error in a stage-IV cosmic shear analysis. This corresponds to a profile with a low multipole peak and large amplitude. In a pseudo-Cl analysis we perform the coupling of the m-bias map with the cosmic shear and the galaxy-galaxy lensing spectra and test their impact on the final 3x2pt cosmological analysis with an MCMC forecast for the LCDM and w0waCDM cosmologies and also applying optimistic and pessimistic scale cuts. Finally, we investigate the effect of the masked sky on the results.

The Galaxy Clustering Spec (GCsp) probe, reference model and performances / **4**

Validation of the MontePython forecasting tools with Euclid synthetic likelihoods

Auteur: Santiago Casas[1]

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We expand and adjust the synthetic Euclid likelihoods of the MontePython software in order to match the exact recipes used
in previous Euclid Fisher matrix forecasts for several probes: weak lensing cosmic shear, photometric galaxy clustering, the cross-

correlation between the latter observables, and spectroscopic galaxy clustering. We also establish which precision settings are
required when running the Einstein–Boltzmann solvers CLASS and CAMB in the context of Euclid. We show that such MontePython forecasts agree very well with previous Fisher forecasts published by the Euclid Collabo-
ration.
Moreover, to establish the validity of the Gaussian approximation, we show that the Fisher matrix marginal
error contours coincide with the credible regions obtained when running Monte Carlo Markov Chains with MontePython while using
the exact same synthetic likelihoods.
These ersatz likelihoods can be used to perform more accurate MCMC forecasts on different parameter extensions and survey settings for various modelling scenarios in preparation for the real analysis with the official likelihood code CLOE.

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Welcome talks and presentation of the meeting

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The Flagship Simulation efforts and roadmap

Auteur: Pablo Fosalba[None]

- Presentation of the Flagship Wide by P. Fosalba
- Presentation of the Flagship Deep by M. Bolzonella

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OU-PHZ status and Roadmap

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Organisation of splinters

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Propagating PSF errors into shear biases

Auteur: Casey Cragg[1]

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We are currently working on propagating expected Euclid PSF errors into shear biases for the WL E2E box as part of the SPV3 exercise. Given some base and perturbed PSFs generated using the PSF Toolkit, we numerically estimate the multiplicative and additive shear biases for galaxies in the Flagship 2 mock catalogue. We currently consider two sources of PSF error: firstly, errors in the PSF modelling across the survey footprint; and secondly, PSF errors arising due to imperfect knowledge of the galaxy SEDs. For the PSF modelling errors, we consider the impact of neglecting the variation in the PSF due to changes in solar aspect angle throughout the survey, resulting in shear biases that vary across the survey footprint. For the galaxy SED errors, we consider the error in the PSF model that arises due to coarse binning and noise in the photometric galaxy SEDs that will be used in the per-galaxy PSF modelling. For both techniques, we calculate shear biases corresponding to a subset of the expected PSFs, and use PCA and kNN techniques to propagate to mock galaxies in flagship. This is ongoing work. In the future, we plan to investigate errors in the PSF calibration at the start of the mission, as well as the impact of blending of the ground-based photometry on the SED errors.

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A novel method to combine clustering and lensing analyses for spectroscopic and photometric samples

Auteur: Stefano Camera[1]

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I present a new technique for the measurement of the growth of cosmic structures via the power spectrum of weak lensing cosmic shear, which can be straightforwardly combined to classic bias and growth measurements from clustering. It is based on a template-fitting approach, where a redshift-dependent amplitude of lensing modulates a fixed template power spectrum. To allow for tracking the redshift evolution of the signal, the method makes use of the Bernardeay-Nishimishi-Taruya transform, which allows for a localisation of the lensing kernel. I show that this method is able to correctly reconstruct $\Omega\sigma 8$ at the percent level across redshift, thus allowing us to measure the growth of structures unbiased by observing discrete tracers. Moreover, I only make use of mea- surements on linear scales. I also demonstrate that the method is robust against an incorrect choice of cosmological parameters in the template, thanks to the inclusion of an Alcock-Paczyński parameter.

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Using cross correlation between 2D and 3D data in Euclid

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Co-auteurs: Brahim Lamine [2]; Fabien Dournac [3]; Isaac Tutusaus [4]; Stéphane Ilic [5]

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Euclid will have the unique feature of simultaneously having 2D probes with 3*2pt but also 3D data on the same areas of the sky. In this presentation I will discuss how to use this information in a cost-effective way and the type of gain that can be forecasted.

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OU-SHE presentation and performances