Euclid-Rubin France joint workshop

jeudi 5 décembre 2024 - jeudi 5 décembre 2024

CCIN2P3

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Rubin-Euclid DDPs

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Probabilistic characterization of blending in Rubin/LSST: application to cluster lensing cosmology

Auteur: Manon Ramel[1]

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The upcoming deep optical surveys, such as the Vera C. Rubin Observatory Legacy Survey of Space and Time (LSST), are set to explore the Universe to unprecedented depths, uncovering billions of galaxies. This amount of detection from the ground will lead to the apparent superposition of galaxies in the images, a phenomenon known as blending. This poses a significant challenge for the precise measurement of individual galaxy properties, especially shapes and redshifts, which are crucial for estimating the masses of large-scale structures, such as galaxy clusters, through weak gravitational lensing.

This talk will introduce an innovative matching approach to properly detect and characterize blended systems in simulated catalogs, in preparation for the future LSST data. The technique employs new metrics —probability of matching and blending entropy —to distinguish recognized and unrecognized blends. It is implemented in the friendly algorithm, developed for the major and international Dark Energy Science Collaboration (DESC) of LSST.

We use it to address the issue of blending in galaxy cluster mass estimates, demonstrating its efficiency. We find that cutting on blending entropy excludes the third of detected galaxies that are strongly impacted by blending from the dataset. We thus demonstrate that blending can cause a low bias in the amplitude of cluster weak lensing profiles, affecting the mass estimates of galaxy clusters. Furthermore, the broader impact of blending on the cosmological parameters Omega_m and sigma_8 from cluster lensing, and how the friendly procedure can mitigate these effects will be discussed.

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Joint Rubin/Euclid image deconvolution

Auteur: Utsav Akhaury[1]

Co-auteurs: Frederic Courbin [1]; Jean-Luc Starck [2]; Pascale JABLONKA [3]

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We present a novel multi-band deconvolution technique aimed at improving the resolution of ground-based astronomical images by leveraging higher-resolution space-based observations. Our method focuses on the joint deconvolution of LSST and Euclid images, effectively utilizing the overlapping

spectral coverage of the Rubin r,i, and z-bands with the Euclid VIS band. We also describe the performance of DRUNet to further denoise the deconvolved images.

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Euclid and Rubin Cluster and protocluster detection and cosmology

Auteur: Simona Mei[None]

Co-auteurs: Anaïs Widmer ; Calum Murray [1]; Cressida Cleland [2]; Dominique Boutigny [3]; James Bartlett [2]; Kirill Grishin [4]; Michel Aguena [2]; Nicolas MAI [2]; Sofia Gallego ; Stéphane ILIC [5]; Vinh-Phat Tran

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We will describe the research work in galaxy cluster science of the APC Rubin/Euclid team, focusing on the team of students and postdocs supervised by Simona Mei and Jim Bartlett. We deleveloped classical and ML algorithms for cluster detection, and the estimation of algorithm selection function. We also focus on the study of galaxy evolution in galaxy clusters and protoclusters

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Flash talks from DDP members

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Status and current plans for Euclid and Rubin data hosting and processing at CC-IN2P3

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1-slide reports from science discussions