

PISCO : A Deep Learning Method for Shear Calibration

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The P*IX*elS to COsmology (PISCO) project aims to develop a deep learning framework for cosmology. The first step of this project focuses on the estimation of gravitational shear from astronomical images, a key observable for weak lensing studies, probing the large-scale structure of the Universe.

We generate simulated galaxy datasets mimicking Euclid observations and use Convolutional Neural Networks (CNNs) to predict average shear components directly from images. Different training strategies, including variations in model architecture and input distributions, are explored to optimize performance.

Our results show that CNNs can reliably recover shear signals, especially when multiple galaxies are included per image, reducing the impact of intrinsic shape noise. Future work will improve model accuracy and simulation realism to enable application to real Euclid data, offering a promising alternative to traditional shear measurement methods and potentially overcoming several of their limitations, such as blending bias.