

Unbiased shear estimation with forward modeling

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As the volume and quality of modern galaxy surveys increase, so does the difficulty of measuring the cosmological signal imprinted in galaxy shapes. Weak gravitational lensing sourced by the most massive structures in the Universe generates a slight shearing of galaxy morphologies called cosmic shear, key probe for cosmological models. Modern techniques of shear estimation based on statistics of ellipticity measurements suffer from the fact that the ellipticity is not a well-defined quantity for arbitrary galaxy light profiles, biasing the shear estimation. I will present how a hybrid physical and deep learning Hierarchical Bayesian Model, where a generative model captures the galaxy morphology, enables us to recover an unbiased estimate of the shear on realistic galaxies, thus solving the model bias. (<https://arxiv.org/abs/2210.16243>)

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