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Intrinsic galaxy size correlations and their importance for weak lensing

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We present a simple model for describing intrinsic correlations for galaxy sizes based on the halo model. Studying these correlations is important both to improve our understanding of galaxy properties and because it is an important potential systematic for weak lensing size magnification measurements. Our model assumes that the density field drives these intrinsic correlations and we also model the distribution of satellite galaxies. We calculate the possible contamination to measurements of lensing convergence power spectrum from galaxy sizes, and show that the cross-correlation of intrinsic sizes with convergence is potentially an important systematic. We also explore how these intrinsic size correlations may affect surveys with different redshift depth. We find that, in this simple approach, intrinsic size correlations cannot be neglected in order to estimate lensing convergence power spectrum for constraining cosmological parameters.

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