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Studying the Effects of Overlapping Objects in Dark Energy[1] KATARZYNA KRZYZANSKA, Princeton University, LSST DARK ENERGY SCIENCE COLLABORATION (DESC) COLLABORATION[2] — Observing the clustering of galaxies allows us to calculate the cosmological parameters necessary for understanding dark energy. However, as the density of observed objects increases, multiple galaxies can appear blended and be observed as one galaxy. This affects the galaxy bias (b) and matter-energy density (Ω_M). To see whether incorrectly inferring the galaxy count is significant, we compare the correlation functions in simulated data for true and observed data sets with 1-to-1 and multiple-to-1 correspondences, respectively. For each data set, we create two correlation functions: one measured directly from the galaxies positions and one model derived from their power spectrum. By minimizing the residual between the functions, we compute the ideal values for b and Ω_M across the possible redshifts that position the galaxies in 3D space. This minimization is done with a Markov chain Monte Carlo (MCMC) estimate that finds one value of Ω_M and ten values for b corresponding to the ten redshift bins ranging from z = 0.2 to z = 1.2. We find that neither b nor Ω_M is particularly affected by the inclusion of blended galaxies. The data suggest that the fluctuations found are a result of noise or limitations on the modeling.

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