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The Effect of the Environment on Galaxy Scaling Relations as a Function of Redshift in Euclid and LSST

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We present predictions on the effect of the local environment on the quenched fraction and early-type fraction of galaxies, as a function of redshift. With a focus on $z=2-3$, we probe how the ‘protocluster’ environment affects galaxy evolution. We compare between various semi-empirical and semi-analytic models. We combine simulated Euclid and LSST data to select for quenched galaxies from $z=0.5$ to 3. Our results show a strong passive-density relation, particularly at high stellar mass, in the GAEA model. We find that this trend is present at least up to $z=3$. We find a similar trend in the morphology-density relation. These results show how important the synergy between Euclid and Rubin will be for obtaining a large statistical sample of galaxies in a range of environments.

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