

# Detection of Galaxy Clusters on DC2 simulated images with Machine Learning

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The distribution of galaxy clusters, the largest gravitationally bound structures in the Universe, helps us to estimate fundamental constants and constrain different cosmological models. With the expected development and commissioning of astronomical instruments, such as LSST, in the next decade, the depth of imaging data for a significant area of the sky will allow us to select nearly complete samples of galaxy clusters at redshifts up to  $z \sim 1$ . To test the cluster detection technique that works directly with the reduced images, we have applied the convolutional neural network YOLO-CL (Grishin et al 2023), trained on SDSS color images for redMaPPer clusters, to precomputed color images for LSST DC2 simulation. In order to reach performance similar to that one for SDSS images we used the same filter set and color scheme for DC2 cutouts. Our results demonstrate that with YOLO-CL trained on SDSS images one can achieve 90% of both purity and completeness.

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