

# Resolved photometry of extragalactic young massive star clusters

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We present colour-magnitude diagrams (CMDs) for a sample of seven young massive clusters in the galaxies NGC 1313, NGC 1569, NGC 1705 and NGC 5236. The clusters have ages in the range 5-50 million years and masses of  $10^5 M_{\odot}$  -  $10^6 M_{\odot}$ . Although crowding prevents us from obtaining photometry in the inner regions of the clusters, we are still able to measure up to 30-100 supergiant stars in each of the richest clusters, along with the brighter main sequence stars. The resulting CMDs and luminosity functions are compared with photometry of artificially generated clusters, designed to reproduce the photometric errors and completeness as realistically as possible. In agreement with previous studies, our CMDs show no clear gap between the H-burning main sequence and the He-burning supergiant stars, contrary to predictions by common stellar isochrones. In general, the isochrones also fail to match the observed number ratios of red-to-blue supergiant stars, although the difficulty of separating blue supergiants from the main sequence complicates this comparison. In several cases we observe a large spread (1-2 mag) in the luminosities of the supergiant stars that cannot be accounted for by observational errors. This spread can be reproduced by including an age spread of 10-30 million years in the models. However, age spreads cannot fully account for the observed morphology of the CMDs and other processes, such as the evolution of interacting binary stars, may also play a role.

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