GALAXY EVOLUTION

Bridging the gap

Astrophys. J. (in the press); preprint at<https://arxiv.org/abs/1803.07577>

Conglomerations of stars can come in different shapes and sizes, from as few as two stars in binary systems up to as many as millions to billions of stars in galaxies. Ultra-compact dwarf galaxies (UCDs) — a few million solar masses or less in mass — were recently discovered to bridge the gap between globular clusters and compact elliptical galaxies. Hong-Xin Zhang and collaborators looked at the stellar population properties of these systems in order to understand their origin.

UCDs may either be tidally disrupted — stripped down — cores of compact elliptical galaxies or they could simply be the massive tails of globular cluster distributions. These two evolutionary scenarios would leave distinct kinematical imprints on UCDs. However, robustly estimating the kinematics of UCDs is very challenging with current-generation telescopes and hence differentiating between these two evolutionary scenarios is highly non-trivial. Zhang et al. instead used the mass, ages, metallicities and $[\alpha/\text{Fe}]$ ratios of UCDs and globular clusters in and around M87 in the Virgo cluster and compared them to compact elliptical galaxies.

The authors combined different lines of evidence for arguing that stripped compact elliptical galaxies might be the dominant contributor to the UCD population. Primarily, UCDs show a clear mass–metallicity relation that is more or less in line with that of compact elliptical galaxies. In contrast, globular clusters do not show such a relation and indeed are offset from the UCD mass–metallicity relation. Zhang et al., however, noted that the presented evidence does not constitute a sufficient condition to rule out the possibility that some UCDs are indeed massive globular clusters.

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Published online: 16 April 2018

<https://doi.org/10.1038/s41550-018-0469-1>