PROCEEDINGS OF SCIENCE

The properties of ultra-compact dwarf galaxies and their possible origin

M. Hilker
Sternwarte der Universität Bonn

Ultra-compact dwarf galaxies (UCDs) have recently been proposed as a new galaxy type (Drinkwater et al. 2003). First discovered in the Fornax cluster (Hilker at al. 1999, Drinkwater et al. 2000), UCDs seem to constitute a galaxy population that is preferentially found in the dense central region of galaxy clusters. UCDs resemble globular clusters, but are up to 100 times more Massive ($1\text{-}5 \cdot 10^7$ $M_{\S}$) and slightly more extended. Their luminosities are comparable to those of nuclei of dwarf ellipticals ($-13.5 < M_V < -11.0$). From high resolution spectroscopy of four UCDs in the Fornax cluster, the internal velocity dispersion of their stars has been derived (see figure). These range from 24 to 37 km/s. The mass-to-light (M/L_B) ratios of the UCDs are of the order 2 - 4 in solar units. This is slightly higher than the M/L ratio of globular clusters, but much lower than that of dwarf spheroidal galaxies of similar mass. The photometric colours of UCDs are comparable to those of metal-rich bulge globular clusters of giant ellipticals. Bright UCDs ($M_V < -12.0$) do not seem to exist in large numbers in galaxy clusters. The fainter ones can easily be confused with the bright globular clusters of the extraordinary rich globular cluster systems of the brightest cluster galaxies, and therefore their exact abundances are unclear (see Mieske et al. 2002, 2004). With respect to the nature of UCDs it is heavily discussed what divides them from "ordinary" star clusters. Various formation scenarios have been brought forward to explain the origin and evolution of UCDs. Two of them seem to be most promising: first, UCDs might be the remnant nuclei of dwarf galaxies that have been disrupted in the cluster environment (Bekki et al. 2003). Second, UCDs might have formed from the agglomeration of many young, massive star clusters that were created during an ancient merger event (Fellhauer & Kroupa 2002). In order to get further insights into the nature of UCDs more observations are needed. In particular, spatially resolved high resolution spectra would be useful to study the radial trend of their internal velocity dispersion. This should clarify whether these objects are dark matter dominated (and thus of galaxian origin) or not.

BDMH 2004 – Baryons in Dark Matter Halos
5–9 October 2004
Novigrad (Croatia)

Published by SISSA

PoS(BDMH2004)038