[구GC-09] The Early Chemical Enrichment Histories of Two Sculptor Group Dwarf Galaxies as Revealed by RR Lyrae Variables

Soung-Chul Yang[1,2,+], Rachel Wagner-Kaiser[3], Ata Sarajedini[3],
Sang Chul Kim[1] and Jaemann Kyeong[1]

[1]Korea Astronomy and Space Science Institute (KASI), Daejeon, 305-348, South Korea, [2]The Observatories of the Carnegie Institution for Science, 813 Santa Barbara Street, Pasadena, CA 91101, USA and [3]Department of Astronomy, University of Florida, P.O. Box 112055, Gainesville, FL 32611

We present the results of our analysis of the RR Lyrae (RRL) variable stars detected in two transition-type dwarf galaxies (dTrans), ESO294-G010 and ESO410-G005 in the Sculptor group, which is known to be one of the closest neighboring galaxy groups to our Local Group. Using deep archival images from the Advanced Camera for Surveys (ACS) onboard the Hubble Space Telescope (HST), we have identified a sample of RR Lyrae candidates in both dTrans galaxies [219 RRab (RR0) and 13 RRc (RR1) variables in ESO294-G010; 225 RRab and 44 RRc stars in ESO410-G005]. The metallicities of the individual RRab stars are calculated via the period-amplitude-[Fe/H] relation derived by Alcock et al. This yields mean metallicities of $<[Fe/H]>_{ESO294} = -1.77 +/- 0.03$ and $<[Fe/H]>_{ESO410} = -1.64 +/- 0.03$. The RRL metallicty distribution functions (MDFs) are investigated further via simple chemical evolution models; these reveal the relics of the early chemical enrichment processes for these two dTrans galaxies. In the case of both galaxies, the shapes of the RRL MDFs are well-described by pre-enrichment models. This suggests two possible channels for the early chemical evolution for these Sculptor group dTrans galaxies: 1) The ancient stellar populations of our target dwarf galaxies might have formed from the star forming gas which was already enriched through "prompt initial enrichment" or an "initial nucleosynthetic spike" from the very first massive stars, or 2) this pre-enrichment state might have been achieved by the end products from more evolved systems of their nearest neighbor, NGC 55.

[구GC-10] Mass function of star clusters in the nuclear starburst region of NGC 253

Sungsoon Lim and Myung Gyoon Lee
Department of Physics and Astronomy, Seoul National University

We present a photometric study of star clusters in the nuclear starburst region of NGC 253 using gVI, YJ, and H band images in the Hubble Space Telescope archive. We find about one thousand star clusters in about 200"x200" field by visual inspection with I<21. We also find about ten thousand star clusters in the same field by automated classification method with magnitude range of $21< I \leqslant 24$. Ages and masses of star clusters are estimated using spectral energy distribution fitting method. Age distribution of star cluster shows two distinguished young populations with peak ages at 3.5 Myr and 18 Myr. Old populations (>100 Myr) are exist, but their number is small. About thirty young massive star clusters (<10 Myr,) are found in nuclear region of NGC 253 which are regarded as a result of the recent starburst. Mass function of young star clusters in NGC 253 is somewhat different with those of star clusters in other galaxies. This result suggests that initial cluster mass functions (ICMFs) for star clusters are not universial. Especially ICMF in starburst galaxies may be distinguishable compared with those in normal spiral galaxies. We discuss the implications of these results.