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Chemical Abundances in the Sagittarius Galaxy: Terzan 7

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Abstract. Abundances of 21 chemical elements have been determined in three red giants in Terzan 7 using high-resolution spectra obtained with the UVES spectrograph on the ESO 8.2 m Kueyen telescope. The mean [Fe/H]= -0.61 ± 0.07. The relative elemental abundance ratios indicate a close similarity of Terzan 7 to its host galaxy.

1. Comparison of Terzan 7 with the Sagittarius system

We have found that 3 red giants in Terzan 7 (S16, S34 and S35) have a mean [Fe/H]= -0.61 ± 0.07(s.d.) and a corresponding age of about 6 Gyr. At a given metallicity the stars exhibit lower [α/Fe]= 0.08 ± 0.04 ratios than stars in the Milky Way galaxy. The mean ratio [O/Fe]= 0.24 shows that the stars have not suffered from the oxygen deficiency. The mean values of [Na/Fe]= -0.15 and [Al/Fe]= -0.14 present no evidence for the Na and Al excesses. Within the iron-group and for light s-process species Y and Zr we see no significant departures from the solar ratios. The heavier s-process elements Ba, La, and Ce show an excess of 0.32 dex while the almost pure r-process element Eu shows an excess of 0.53 dex. The similarity of relative abundances in Terzan 7 and stars of the same metallicity in its host galaxy indicates that this cluster could be a natural product of galactic evolution. Obviously some galaxies are capable of forming globular clusters after the initial burst of star cluster formation. The chemical evolution of the Sagittarius dwarf spheroidal galaxy looks very similar to the evolution of the Large Magellanic Cloud.