[ST12] First stars as a possible origin for the helium-rich population in ω Cen

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The most massive Galactic globular cluster ω Cen appears to have two, or perhaps more, distinct main sequences. Its bluest main sequence is at the centre of debate because it has been suggested to have an extremely high helium abundance of Y ~ 0.4. The same helium abundance is claimed to explain the presence of extreme horizontal branch stars of ω Cen as well. This demands a relative helium to metal enrichment of ΔY /ΔZ ~ 70; that is, more than one order of magnitude larger than the generally accepted value, 1 - 5. Candidate solutions, namely, AGB stars, massive stars, and supernovae, have been suggested; but in this study, we show that none of them is a viable channel, in terms of reproducing the high value of ΔY /ΔZ. Essentially no ordinary stars, including those candidates, can produce such a high ΔY /ΔZ because they all produce metals as well as helium. As an alternative, we investigate the possibility of the stochastic (low-chance event) "first star" contamination to the gas from which the younger generation of ω Cen formed. This requires the assumption that Population III star formation episode overlaps with that of Population II stars. While the required condition appears extreme, very massive objects in the first star generation provide a plausible solution.

[ST13] A new field SX Phoenicis-type star: revisited

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We performed a multi-site observation of a new field SX Phe star using the BOAO 1.8m telescope and the LOAO 1.0m telescope. The new SX Phoenicis star had been discovered through the time series CCD photometry using a small refracting telescope (Φ=155mm, *f*=1050mm). We confirmed double-radial mode and many combination frequencies by multiple frequency analysis. Using the data of multi-site observation, we could obtain more detailed light curves and results of multiple frequency analysis.