FORS2/VLT survey of Milky Way globular clusters: candidates to have origin in disrupted dwarf galaxies

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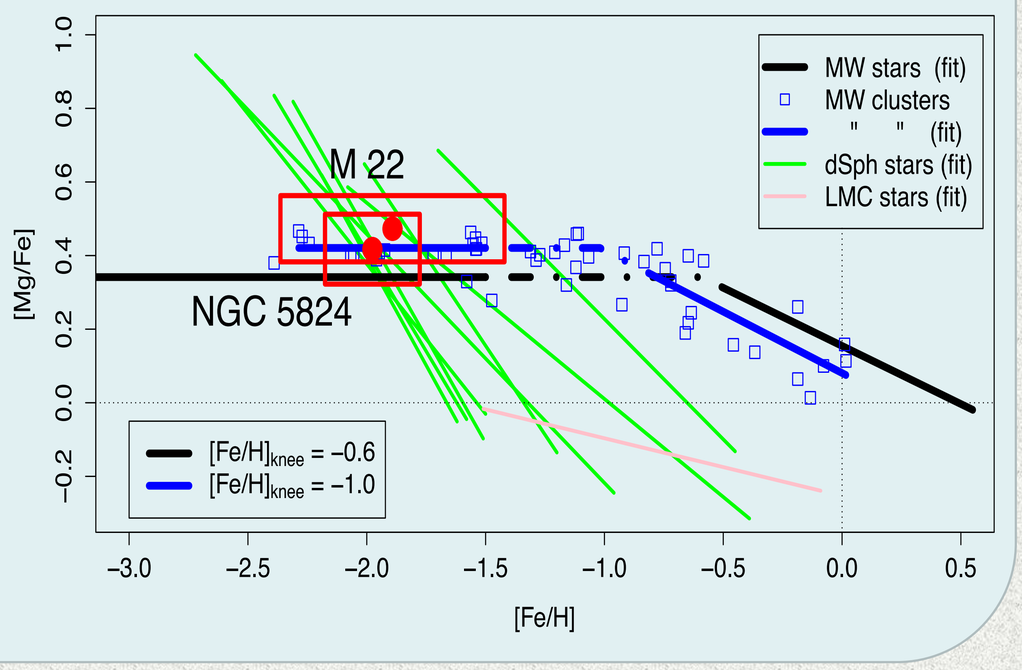
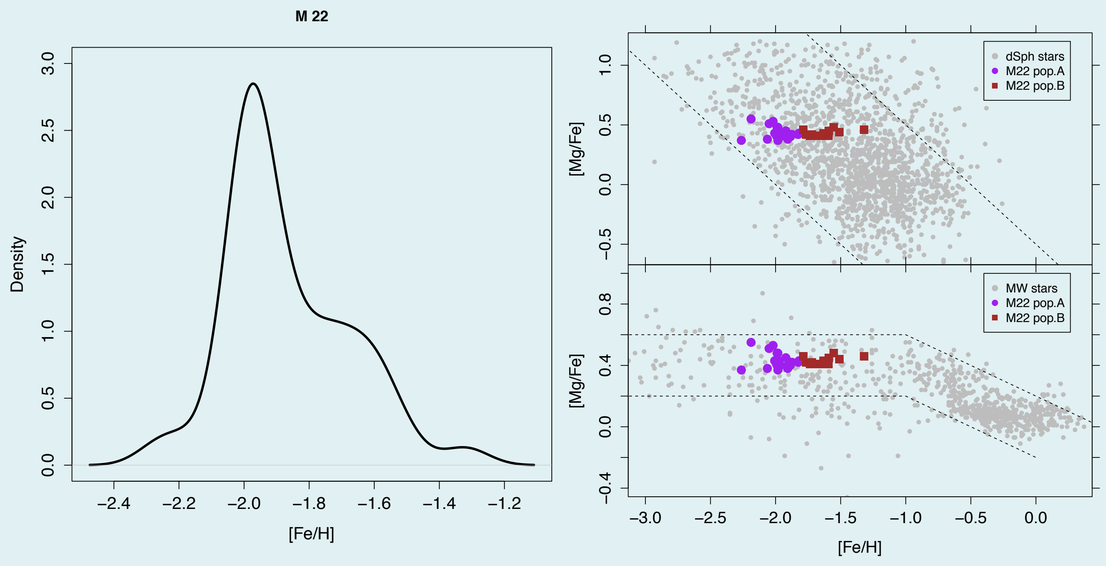
Introduction: MW stars, clusters, and satellites

FORS2/VLT survey (Dias et al. 2015a,b) consists in R~2000 spectroscopy of over 800 red giant stars in 51 Milky Way globular clusters from bulge, disc, and halo. We derived [Fe/H] and [Mg/Fe] for all stars and their averages per cluster, which shows the chemical enrichment by SNII (Mg,Fe) and SNIa (Fe). The "knee" explicitly represented in blue and black lines marks the maximum metallicity reached by SNII enrichment before SNIa start. The figure shows that MW stars were enriched more efficiently than most of the globular clusters. Clusters were more efficiently enriched than dSph galaxies. M22 and NGC5824 have a spread in their [Fe/H] abundance and no detectable spread in [Mg/Fe] as displayed by the red rectangles.



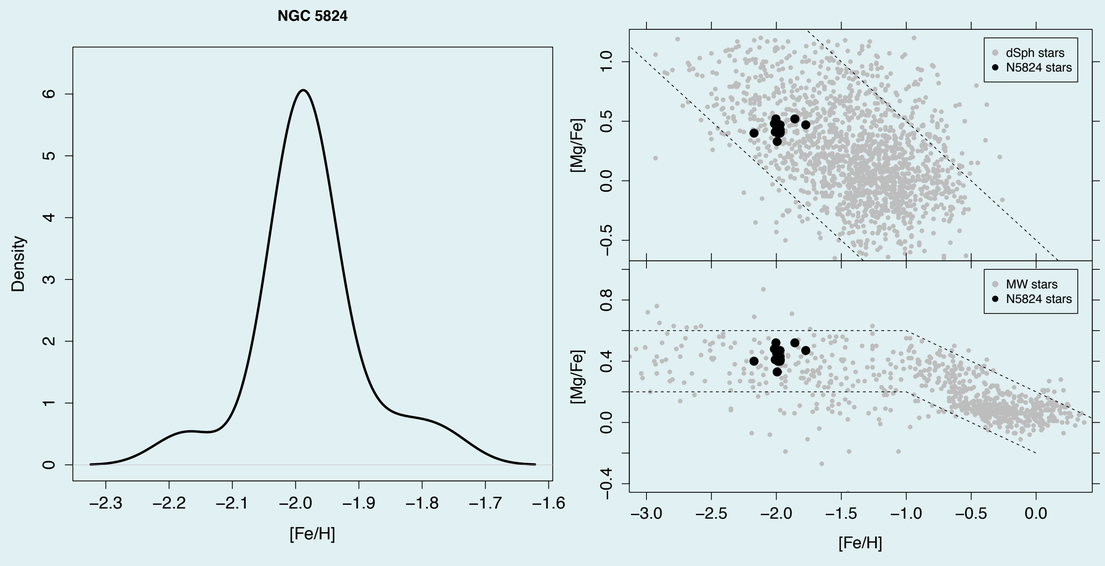
M22 came from an UCD galaxy

Da Costa et al. (2009) revealed an intrinsic spread in metallicity for M22 (41 member stars), comparing it to ωCen. The 44 member stars from our survey agrees well with the [Fe/H] spread and we further show negligible spread or trend in [Mg/Fe]. This is in agreement with Marino et al. (2011) who thinks M22 is a result of a merger of two clusters in a dSph, not in the Galactic halo. The plot shows an enrichment pattern as efficient as that of our Galaxy, which can be reached by massive dSph as Fornax (Kirby et al. 2011) or dense environments such as UCDs (Francis et al. 2012).



NCG5824 came from a dSph galaxy

Newberg et al. (2009) discovered the Cetus Polar Stream and related NGC5824 to it because this cluster is located in the fitted orbit of the stream and have similar metallicities and velocities. We have 15 member stars for this cluster which reveal a small dispersion in agreement with the findings of Saviane et al. (2012) and Da Costa et al. (2014) based on CaT metallicity for 17 and 108 member stars. The comparison of [Mg/Fe] and [Fe/H] with MW and dSph stars is inconclusive based on 15 stars.



Conclusions

From our survey of 51 MW globular clusters we conclude that clusters were formed in a more efficient environment than dSph galaxies. We found two interesting clusters in the sample with spread in [Fe/H]. The detailed chemical analysis of M22 is consistent with an origin in a UCD galaxy that lost its external stars. NGC5824 was probably originated in the nucleus of a dSph galaxy based on [Fe/H], and [Mg/Fe] distribution is inconclusive with 15 stars.

References

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Acknowledgements:

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YouTube *youtu.be/t9rDV-m7pXc* (talk)