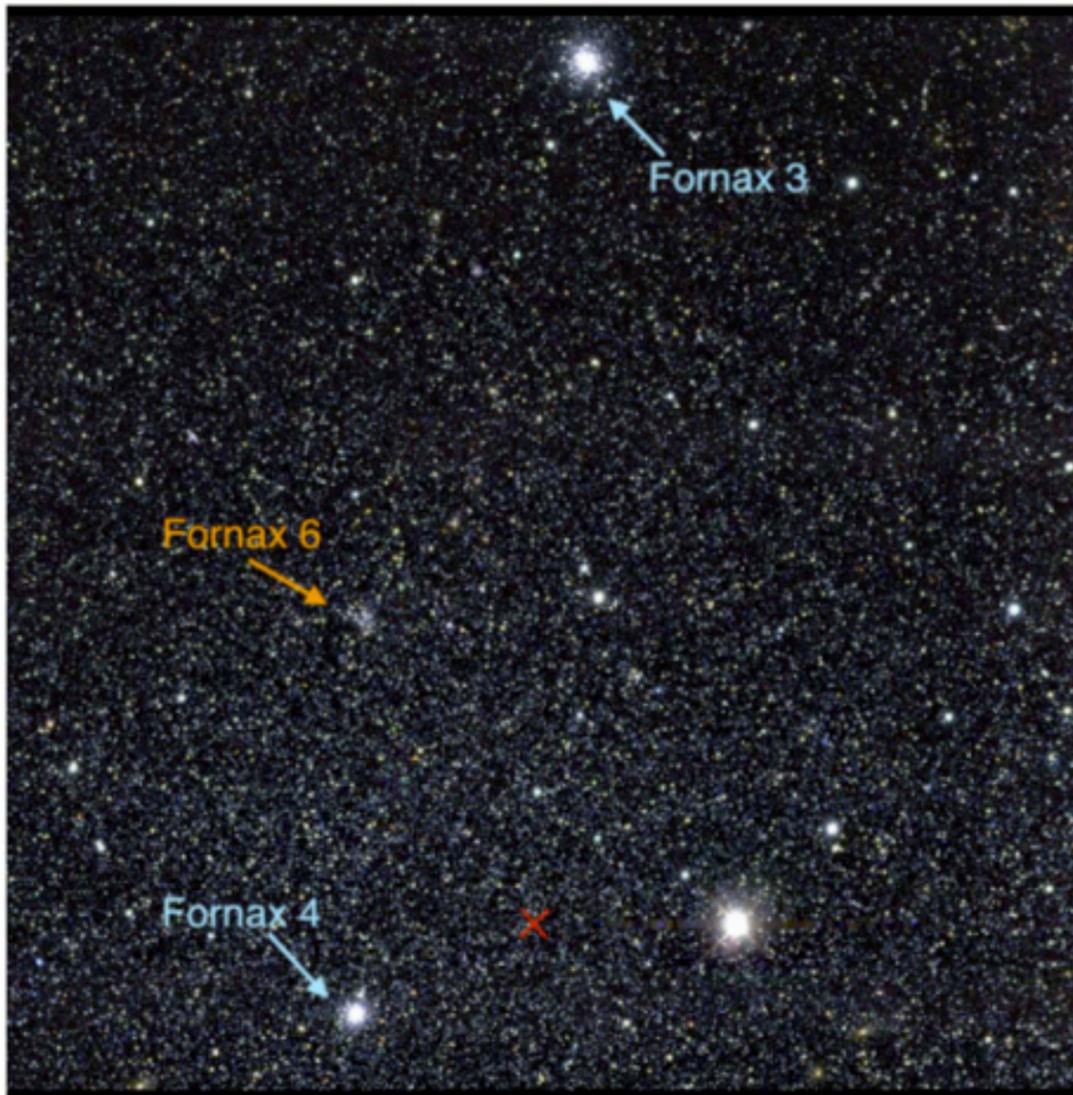
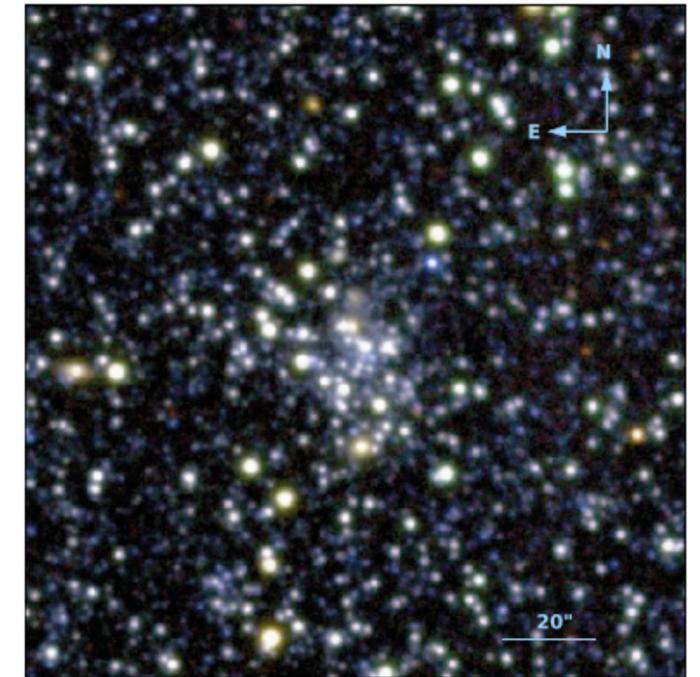


The Nature of the Fornax 6 Globular Cluster with Magellan/M2FS Spectroscopy

Andrew Pace (Carnegie Mellon University)



Fornax dSph is one of the brightest dSph satellite galaxies of the MW. It is one of the only dwarf galaxies to have globular clusters at its stellar mass ($\sim 5 \times 10^8 M_{\odot}$). Fornax has 6 globular clusters and the 6th has recently been rediscovered with DECam imaging (Wang et al. 2019). We obtained Magellan/M2FS spectroscopy of individual red-giant branch stars to confirm the Fornax 6 cluster and to determine its properties.



Cutout centered on the F6 cluster.
From Wang et al 2019

Rediscovery of Fornax 6 Globular Cluster
From Wang et al 2019

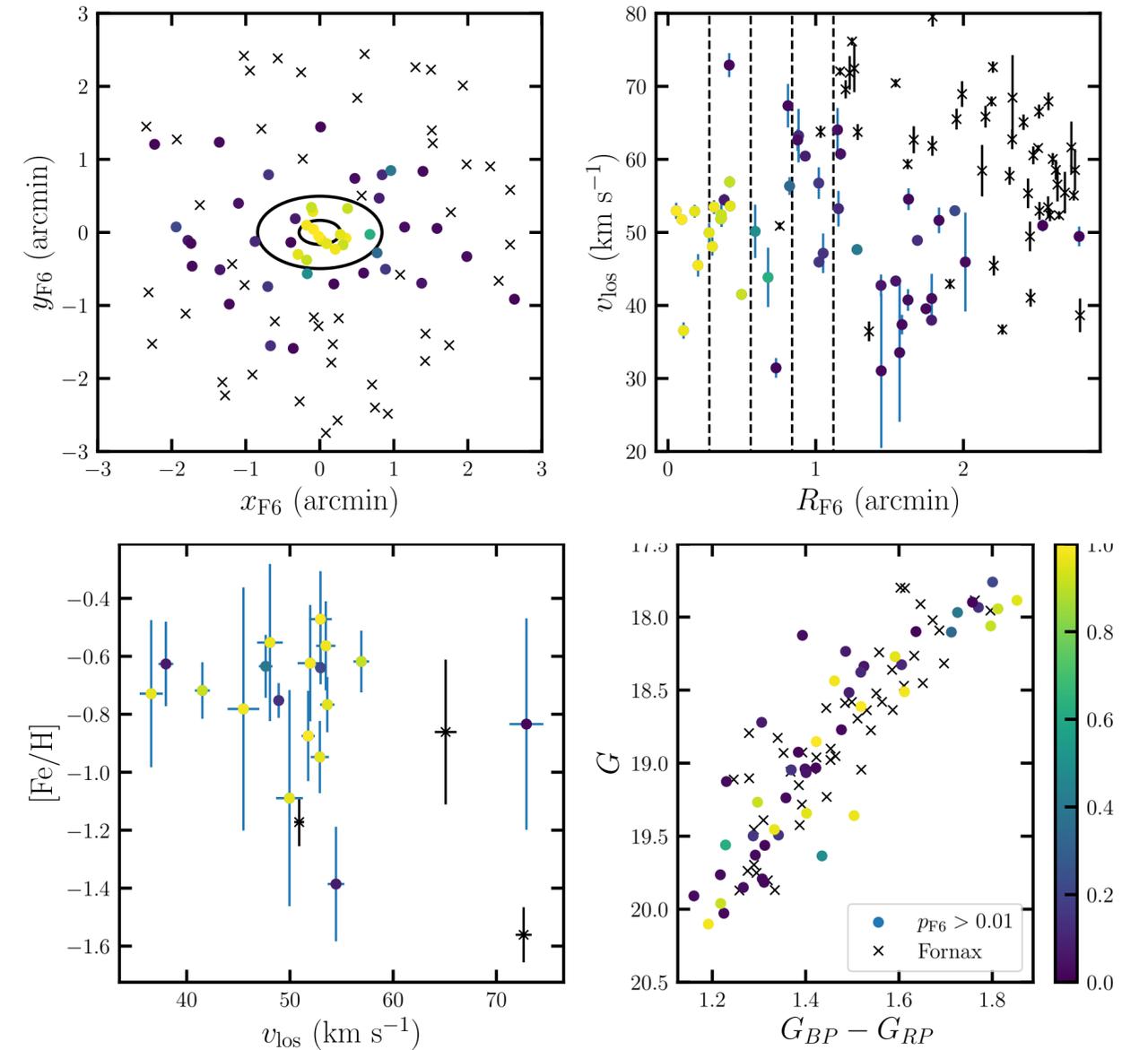
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From Magellan/M2FS spectroscopy we identified ~ 17 cluster members based on the spatial location, line-of-sight velocity, metallicity, and Gaia photometry. The line-of-sight velocity is consistent with the Fornax dSph and confirms they are associated. Their velocity dispersion and metallicity dispersion suggest the object is a star cluster. We measure a surprisingly high metallicity ($[\text{Fe}/\text{H}] \sim -0.7$) compared to the other 5 Fornax globular clusters ($-2.5 < [\text{Fe}/\text{H}] < -1.5$).

Properties of Fornax 6

Parameter	Fornax 6
r_h (parsec)	11.3 ± 1.4
M_V (mag)	-4.8 ± 0.4
$\overline{v_{\text{los}}}$ (km s^{-1})	$50.5^{+1.7}_{-1.7}$
σ_v (km s^{-1})	$5.6^{+2.0}_{-1.6}$
$[\text{Fe}/\text{H}]$ (dex)	$-0.71^{+0.05}_{-0.05}$
$\sigma_{[\text{Fe}/\text{H}]}$ (dex)	< 0.17
N	17.3 ± 2.7

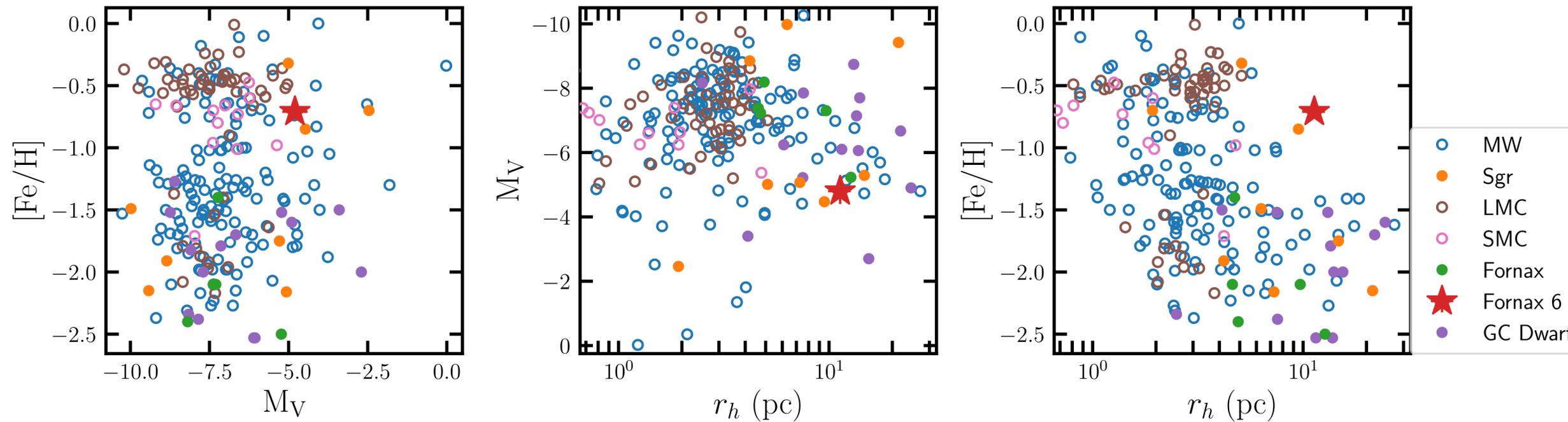


Identification of Fornax 6 members in Fornax dSph background

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Comparison to Other Globular Clusters



The Fornax 6 cluster is more metal-rich than the other Fornax clusters and other dwarf galaxy hosts. It is similar to the Sagittarius cluster, Palomar 12. It is larger than clusters of similar metallicity.

We estimated an age of ~ 2 Gy by comparing theoretical isochrones at the spectroscopic metallicity to the Gaia color-magnitude diagram.

This age places the formation around the most recent pericenter of the Fornax dSph and near a recent burst of star formation.

Deeper photometric data is required to improve the age measurement.

The survival of the Fornax globular clusters is probe to determine the dark matter halo of the Fornax dSph.

