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ERRATUM: "THE DYNAMICS AND METALLICITY DISTRIBUTION OF THE DISTANT DWARF GALAXY VV124" (2012, ApJ, 751, 46)

EVAN N. KIRBY[1,4], JUDITH G. COHEN[2], AND MICHELE BELLAZZINI[3]
[1] Department of Physics & Astronomy, University of California Irvine, 4129 Frederick Reines Hall, Irvine, CA 92697-4575, USA
[2] California Institute of Technology, 1200 E. California Blvd., MC 249-17, Pasadena, CA 91125, USA
[3] INAF-Osservatorio Astronomico di Bologna, via Ranzani 1, I-40127 Bologna, Italy
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We reported measurements of iron abundance in VV124 that were too high by about 0.4 dex. Our metallicity measurement technique used the photometric color of each star to anchor the effective temperature in the determination of [Fe/H]. The temperature was allowed to vary based on information in the spectrum, but it was allowed to vary only within a limited range around the photometric determination of the temperature. In order to determine the photometric temperature, we used the $g - r$ color of the star in conjunction with Yonsei-Yale theoretical isochrones (Demarque et al. 2004). However, a bug in our computer code interpreted the $g - r$ colors as $g - i$ colors. The resulting temperatures were too high, leading to iron abundances that were too high.

Here, we report the corrected values of [Fe/H]. From the corrected metallicities, we redetermined the systematic error term to be $\sigma_{\rm sys,[Fe/H]} = 0.216$. We show the updated metallicity histogram (Figure 12), radial metallicity gradient (Figure 13), and VV124's place in the mass–metallicity relation for Local Group dwarf galaxies (bottom panel of Figure 14). We also provide the catalog of stars in VV124 with updated metallicity measurements (Table 2) and the updated summary of the metallicity distribution (bottom of Table 3).

Our qualitative conclusions are mostly unchanged. The lower average metallicity ($\langle$[Fe/H]$\rangle = -1.58 \pm 0.06$) is in better agreement with the photometric metallicities reported by Jacobs et al. (2011) and Bellazzini et al. (2011). There is still a radial metallicity gradient of d[Fe/H]$/dr = -0.22 \pm 0.05$ dex kpc^{-1}. The lower metallicity also brings VV124 even closer to the mass–metallicity relation defined by the dwarf spheroidal satellite galaxies of the Milky Way (Kirby et al. 2011). If VV124 obeyed the same relation as those galaxies, then it would have a mean metallicity of $\langle$[Fe/H]$\rangle = -1.45 \pm 0.09$. The average metallicity of VV124 lies below the relation but within the rms scatter.

[4] Center for Galaxy Evolution Fellow.

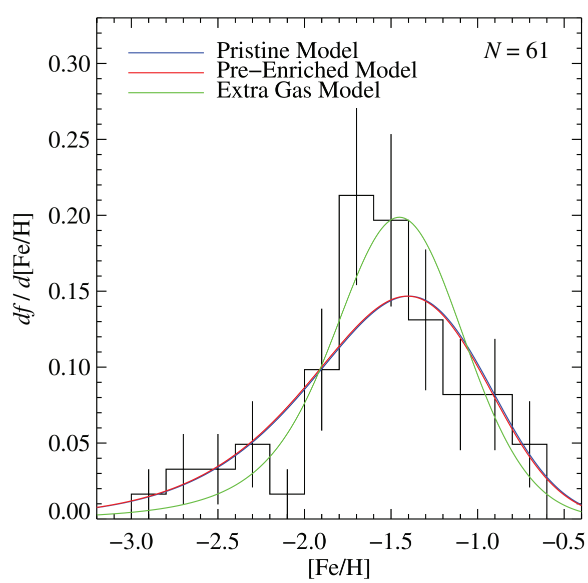

Figure 12. Metallicity distribution for member stars. Error bars are calculated with Poisson statistics. Best-fitting, analytic models of chemical evolution are shown as colored curves. The red and blue lines overlap almost exactly.

(A color version of this figure is available in the online journal.)

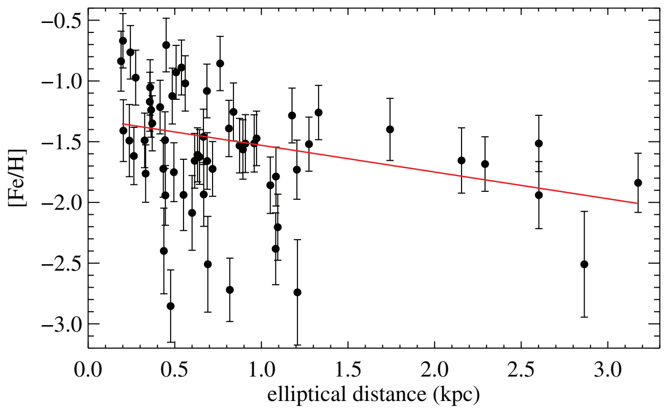

Figure 13. Metallicity as a function of elliptical distance from the center of VV124. The elliptical distance is the semimajor axis of the ellipse ($\epsilon = 0.44$) on which the star lies. The red line is a least-squares fit.

(A color version of this figure is available in the online journal.)

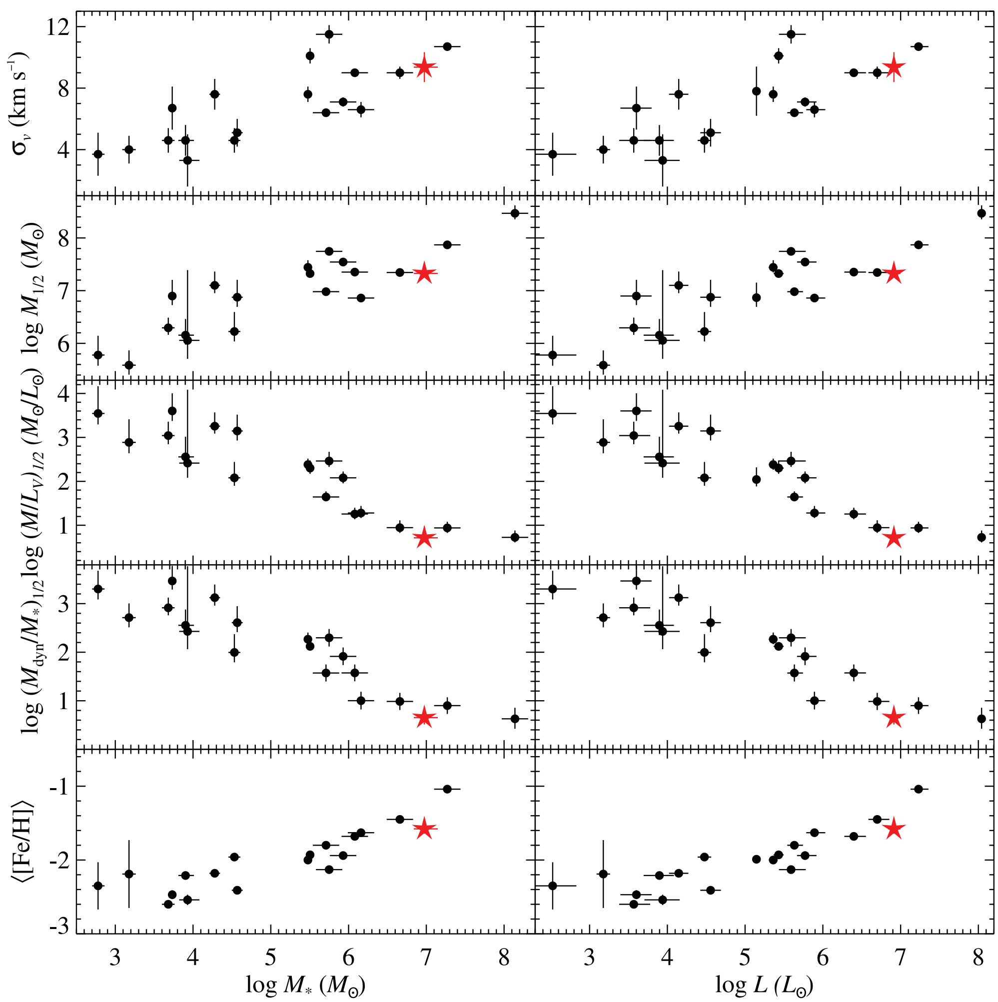

Figure 14. Velocity dispersion, mass within the half-light radius, mass-to-light ratio within the half-light radius, dynamical-to-stellar mass ratio within the half-light radius, and average metallicity vs. stellar mass (left) and luminosity (right) for dSph and dwarf elliptical galaxies in the Local Group. VV124 is represented by a red star. Dynamical quantities (σ_v, $M_{1/2}$, $(M/L_V)_{1/2}$ and $(M_{\rm dyn}/M_*)_{1/2}$) were taken from Wolf et al. (2010) and references therein for all galaxies except Boötes I. For Boötes I, we adopted σ_v from Koposov et al. (2011), and we adjusted its mass accordingly. The stellar masses were taken from Woo et al. (2008) for the larger dSphs and from Martin et al. (2008, using the values derived with the Kroupa et al. 1993 initial mass function) for the ultra-faint dSphs. The metallicities came from Kirby et al. (2011) except for Carina (Helmi et al. 2006) and Boötes I (Martin et al. 2007).

(A color version of this figure is available in the online journal.)

Table 2
Target List

ID	R.A. (J2000)	Decl. (J2000)	g	r	Masks[a]	S/N ($Å^{-1}$)	v_r (km s^{-1})	EW(Na I 8190) (Å)	[Fe/H]	Member?	Reason[b]
13585	09 15 09.6	+52 49 52.0	24.351 ± 0.030	23.295 ± 0.043	1	4.1	···	···	···	N	G
16765	09 15 10.8	+52 48 34.1	25.600 ± 0.038	23.667 ± 0.046	1	4.9	···	···	···	N	Bad
11688	09 15 11.8	+52 50 12.4	25.268 ± 0.029	23.365 ± 0.025	1	15.5	···	···	···	N	G
16355	09 15 11.8	+52 48 50.4	24.183 ± 0.011	23.125 ± 0.016	1	4.1	···	···	···	N	Bad
16895	09 15 13.4	+52 48 29.4	24.198 ± 0.021	23.337 ± 0.032	1	2.2	···	···	···	N	Bad
3705	09 15 15.4	+52 51 59.3	24.651 ± 0.015	23.217 ± 0.018	1	25.6	$+31.5 \pm 2.7$	3.21 ± 0.24	···	N	v_r Na
16598	09 15 16.9	+52 48 40.7	23.009 ± 0.006	21.553 ± 0.007	1	50.9	-68.1 ± 2.4	2.22 ± 0.06	···	N	v_r Na Bright
16798	09 15 17.5	+52 48 32.7	22.361 ± 0.006	20.841 ± 0.007	1	68.8	-25.5 ± 2.3	2.45 ± 0.04	···	N	Na Bright
7035	09 15 17.9	+52 50 58.8	22.720 ± 0.010	22.720 ± 0.013	2	16.5	···	···	···	N	G
7917	09 15 19.8	+52 50 49.5	24.287 ± 0.012	23.183 ± 0.017	2	13.0	-40.1 ± 4.8	···	-1.51 ± 0.23	Y	

References. Identifications, coordinates, and photometry from Bellazzini et al. (2011).
[a] Number of DEIMOS masks on which the object was observed.
[b] Reasons for non-membership. v_r: Inappropriate radial velocity. Na: Spectrum shows strong Na I λ8190 doublet. G: Spectrum shows emission lines or redshifted Ca H and K lines, indicating that the object is a galaxy. Bright: Target is brighter than the TRGB. Bad: Spectral quality was insufficient for radial velocity measurement.

(This table is available in its entirety in a machine-readable form in the online journal. A portion is shown here for guidance regarding its form and content.)

Table 3
Properties of VV124

Property	Symbol	Value
Photometry		
Distance[a]	D	1.36 ± 0.03 Mpc
Luminosity[b]	L_V	$8.2^{+1.6}_{-1.4} \times 10^6\ L_\odot$
Stellar mass[c]	M_*	$9.4^{+3.8}_{-2.9} \times 10^6\ M_\odot$
Gas mass[b]	$M_{\rm gas}$	$8.7 \times 10^5\ M_\odot$
Half-light radius[b]	R_e	$41''.3 = 260$ pc
Dynamics		
Mean radial velocity	$\langle v_r \rangle$	-29.1 ± 1.3 km s^{-1}
Line-of-sight velocity dispersion	σ_v	9.4 ± 1.0 km s^{-1}
Mass within half-light radius[d]	$M_{1/2}$	$(2.12 \pm 0.22) \times 10^7\ M_\odot$
Mass-to-light ratio within half-light radius[d]	$(M/L_V)_{1/2}$	$5.2 \pm 1.1\ M_\odot/L_\odot$
Dynamical-to-stellar mass ratio within half-light radius[cd]	$(M_{\rm dyn}/M_*)_{1/2}$	4.5 ± 1.9
Total mass[e]	$M_{\rm tot}$	$(1.95 \pm 0.40) \times 10^7\ M_\odot$
Total mass-to-light ratio[e]	$(M/L_V)_{\rm tot}$	$4.8 \pm 1.3\ M_\odot/L_\odot$
Metallicity		
Mean metallicity[f]	⟨[Fe/H]⟩	-1.58 ± 0.06
Standard deviation	σ([Fe/H])	0.51
Median metallicity	med([Fe/H])	−1.52
Median absolute deviation	mad([Fe/H])	0.27
Interquartile range	IQR([Fe/H])	0.58
Skewness	Skew([Fe/H])	-0.51 ± 0.31
Kurtosis	Kurt([Fe/H])	-0.01 ± 0.60
Yield (simple model)	p (Simple)	$0.045^{+0.007}_{-0.006}\ Z_\odot$
Yield (pre-enriched model)	p (Pre-Enriched)	$0.044^{+0.008}_{-0.007}\ Z_\odot$
Initial metallicity (pre-enriched model)	$[Fe/H]_0$	<-3.21
Yield (extra gas model)	p (Extra Gas)	$0.041^{+0.006}_{-0.005}\ Z_\odot$
Extra gas parameter (extra gas model)	M	$2.86^{+2.01}_{-1.15}$

References. a: Jacobs et al. (2011). b: Bellazzini et al.
[c] Although Bellazzini et al. assumed $M_*/L_V = 2$, we assumed that $M_*/L_V = 1.10$, a value more typical of transition-type dwarfs (Woo et al. 2008). We used this stellar mass-to-light ratio to calculate these quantities. The value could range from 0.8 to 1.5, and we took these limits into account in the estimation of the uncertainties.
[d] Using the formula $M_{1/2} = 4G^{-1} R_e \sigma_v^2$ (Wolf et al. 2010).
[e] Using the formula $M_{\rm tot} = 167 \mu r_c \sigma_v^2$ (Illingworth 1976), which may not be appropriate for VV124. This formula often gives smaller $M_{\rm tot}$ than the formula for $M_{1/2}$.
[f] Although Kirby et al. (2011) calculated ⟨[Fe/H]⟩ with inverse variance weighting, we present the unweighted mean. The low S/Ns of many of our spectra cause the error on [Fe/H] to increase strongly with decreasing metallicity. Therefore, the weighted mean would be biased toward high [Fe/H].

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