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A MATCHED CATALOGUE OF I'-BAND DROP-OUT GALAXIES AT $Z \approx 6$ IN THE ULTRA DEEP FIELD

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ABSTRACT

A recent preprint by Yan & Windhorst (astro-ph/0407493) independently repeats our selection of candidate $z \approx 6$ galaxies in the Hubble Ultra Deep Field (astro-ph/0403223). The agreement of this independent study with our original work is excellent, and most of the i'-band drop-out galaxies are reproduced. To avoid confusion with various ID numbers for sources, we present the community with a matched list of i'-band drop-outs in the Hubble Ultra Deep Field.

Subject headings:

In March 2004 we used the publically-released imaging of the Hubble Ultra Deep Field (UDF) to identify candidate $z \approx 6$ galaxies through their large $(i' - z')$ colour, due to the Lyman-α break at high redshift. In astro-ph/0403223 (Bunker et al. 2004) we identified 54 candidate galaxies with $(i'-z')_{AB} > 1.3$ and $z'_{AB} < 28.5$ ($8\,\sigma$ detection), corresponding to unobscured star formation rates as low as $1\,M_{\odot}\,\mathrm{yr}^{-1}$ at $z \approx 6$ (equivalent to $0.1\,L^*_{UV}$ for the Lyman break population of U-band dropouts at $z \approx 3$). Subsequently, our analysis of the UDF has been independently repeated by Yan & Windhorst (astro-ph/0407493) who also push to fainter magnitudes, where the completeness corrections become significant. We are pleased to report that the analysis of Yan & Windhorst recovers almost all of our original i'-band drop-out galaxies.

To avoid confusion over different naming conventions for the same sources, we present here a matched list of ID numbers between our first paper on the UDF i'-band drop-out galaxies (astro-ph/0403223), and the recent preprint of Yan & Windhorst (astro-ph/0407493), as well as providing the corresponding identifications in the UDF v1.0 catalogue released by STScI[1]. There is good agreement between the aperture magnitudes (with an aperture correction appropriate for compact sources) reported in our paper and the measurements of total magnitudes (SExtractor 'MAG_AUTO') by Yan & Windhorst from the same images – the typical difference is only 0.1 mag in z'-band, and the reported galaxy centroids typically agree to within $0.03 - 0.06$ arcsec ($1 - 2$ pixels in the drizzled image).

Of the 53 brightest objects in the Yan & Windhorst list (their IDs #1—48, including multiple sources #1a,b, #2a,b, #5a,b,c, #7a,b) all are contained in our original list (plus #58), with the exception of just three objects. Two of these (#12 and #41) lie in the noisy edge region, outside the good quality central 11 arcmin^2 within which we restricted our original analysis. The third object, #31, has magnitudes $i'_{AB} = 29.35$ and $z'_{AB} = 28.21$ in our catalogue, so its colour of $(i' - z')_{AB} = 1.16$ from our photometry is slightly blue of the $(i' - z')_{AB} > 1.3$ cut adopted for i'-band drop-outs. Hence the catalogues agree at the 98% level (one discrepant object out of 50). We note that the two brightest i'-band drop-outs are probable low-mass stars with $z'_{AB} \approx 25.3$: the Bunker et al. source 2140 (which also lies in the noisy edge region and appears as object #9 in the Yan & Windhorst catalogue) was first identified as having i'-drop colours but flagged as a probably star in Stanway, Bunker & McMahon (2003 MNRAS 342, 439, object SBM03#5). The other probable star is Bunker et al. source 11337 (object #8 in the Yan & Windhorst catalogue). We note that our source 46574 (object #3) has a near neighbour clearly detected in v-band, and may be at low redshift.

There are only 3 i'-band drop-outs which appeared in our original catalogue and are not reproduced in the new Yan & Windhorst list (ignoring double sources): these are objects 49117, 14210 & 42806 in Bunker et al. (2004) We have inspected these again, and they appear reasonable candidates, although there are nearby galaxies which are not i'-drops which may influence the photometry.

[1] ftp://archive.stsci.edu/pub/hlsp/udf/acs-wfc/h_udf_wfc_V1_z_cat.txt

TABLE 1
i-band dropouts in the UDF. The two probable stars are above the line, all others are spatially resolved.

Bunker et al. ID	Yan ID	STScI ID	RA & Declination J2000 (Bunker et al.)	z'_{AB} (Bunker) (0.″5-diam aper)	z'_{AB} (Yan) (total)	$\Delta z'$ (mag) Bunker – Yan
(2140)⋆	# 9	—	03 32 38.80 −27 49 53.6	25.22 ± 0.02	25.43	-0.21
(11337)	# 8	443	03 32 38.02 −27 49 08.4	25.29 ± 0.02	25.41	-0.22
20104[1]	#1a	2225	03 32 40.01 −27 48 15.0	25.35 ± 0.02	25.25	0.10
42929[2]	#2a	8033	03 32 36.46 −27 46 41.4	26.56 ± 0.03	26.49	0.07
41628	#10	8961	03 32 34.09 −27 46 47.2	26.65 ± 0.04	26.64	0.01
(46574)	# 3	7730	03 32 38.28 −27 46 17.2	26.71 ± 0.04	26.68	0.03
24019	#11	3398	03 32 32.61 −27 47 54.0	26.80 ± 0.04	26.68	0.12
52880	#16	9857	03 32 39.07 −27 45 38.8	27.00 ± 0.05	27.00	0.00
23516	# 4	3325	03 32 34.55 −27 47 56.0	27.04 ± 0.05	26.93	0.11
10188	#15	322	03 32 41.18 −27 49 14.8	27.10 ± 0.05	26.99	0.11
21422	#20	2690	03 32 33.78 −27 48 07.6	27.23 ± 0.05	27.35	-0.12
25578[D]	#13	—	03 32 47.85 −27 47 46.4	27.30 ± 0.06	26.97	0.33
25941	# 6	4050	03 32 33.43 −27 47 44.9	27.32 ± 0.06	27.23	0.09
26091[D]	#14	4110	03 32 41.57 −27 47 44.2	27.38 ± 0.06	26.97	0.41
24458	#23	3630	03 32 38.28 −27 47 51.3	27.51 ± 0.07	27.50	0.01
21262	#19	2624	03 32 31.30 −27 48 08.3	27.52 ± 0.07	27.31	0.21
13494	#18	30591	03 32 37.28 −27 48 54.6	27.56 ± 0.07	27.25	0.31
24228	#5b	3450	03 32 34.28 −27 47 52.3	27.63 ± 0.07	27.17	0.46
16258	#17	1400	03 32 36.45 −27 48 34.3	27.64 ± 0.07	27.12	0.52
42414	#22	9202	03 32 33.21 −27 46 43.3	27.65 ± 0.07	27.39	0.26
27173	#21	4377	03 32 29.46 −27 47 40.4	27.73 ± 0.08	27.37	0.36
49117[D]	—	—	03 32 38.96 −27 46 00.5	27.74 ± 0.08		
49701	#28	36749	03 32 36.97 −27 45 57.6	27.78 ± 0.08	27.72	0.06
24123	#5a	—	03 32 34.29 −27 47 52.8	27.82 ± 0.08	26.97	0.85
27270	#32	33003	03 32 35.06 −27 47 40.2	27.83 ± 0.08	27.84	-0.01
23972	#5c	3503	03 32 34.30 −27 47 53.6	27.84 ± 0.09	27.76	0.08
14751	#29	1086	03 32 40.91 −27 48 44.7	27.87 ± 0.09	27.75	0.12
44154	#7a	35945	03 32 37.46 −27 46 32.8	27.87 ± 0.09	27.50	0.37
35084	#26	34321	03 32 44.70 −27 47 11.6	27.92 ± 0.09	27.65	0.27
42205	#30	8904	03 32 33.55 −27 46 44.1	27.93 ± 0.09	27.78	0.15
46503	#36	7814	03 32 38.55 −27 46 17.5	27.94 ± 0.09	27.97	-0.03
19953	#1b	2225	03 32 40.04 −27 48 14.6	27.97 ± 0.09	27.41	0.56
52086	#34	36786	03 32 39.45 −27 45 43.4	27.97 ± 0.09	27.89	0.08
44194	#7b	35945	03 32 37.48 −27 46 32.5	28.01 ± 0.10	27.78	0.23
21111[D]	#33	2631	03 32 42.60 −27 48 08.9	28.02 ± 0.10	27.86	0.16
46223[D]	#24	35506	03 32 39.87 −27 46 19.1	28.03 ± 0.10	27.61	0.42
22138	#40	32007	03 32 42.80 −27 48 03.2	28.03 ± 0.10	28.06	-0.03
14210	—	978	03 32 35.82 −27 48 48.9	28.08 ± 0.10		
45467	#38	35596	03 32 43.02 −27 46 23.7	28.08 ± 0.10	28.00	0.08
12988[D]	#25	30534	03 32 38.49 −27 48 57.8	28.11 ± 0.11	27.63	0.48
30359	—	33527	03 32 30.14 −27 47 28.4	28.13 ± 0.11		
11370	#45	482	03 32 40.06 −27 49 07.5	28.13 ± 0.11	28.20	-0.07
24733	#27	32521	03 32 36.62 −27 47 50.0	28.15 ± 0.11	27.65	0.50
37612	#37	34715	03 32 32.36 −27 47 02.8	28.18 ± 0.11	27.99	0.19
41918	#46	7829	03 32 44.70 −27 46 45.5	28.18 ± 0.11	28.27	-0.09
21530	#42	31874	03 32 35.08 −27 48 06.8	28.21 ± 0.12	28.13	0.08
42806[2]	#2b	8033	03 32 36.49 −27 46 41.4	28.21 ± 0.12	27.76	0.45
27032[D]	#21	4377	03 32 29.45 −27 47 40.6	28.22 ± 0.12	27.37	0.85
52891	#43	36697	03 32 37.23 −27 45 38.4	28.25 ± 0.12	28.14	0.11
17908	#35	1834	03 32 34.00 −27 48 25.0	28.25 ± 0.12	27.94	0.31
48989[D]	#39	36570	03 32 41.43 −27 46 01.2	28.26 ± 0.12	28.00	0.26
17487	#47	—	03 32 44.14 −27 48 27.1	28.30 ± 0.12	28.30	0.00
18001	#48	31309	03 32 34.14 −27 48 24.4	28.40 ± 0.13	28.38	0.02
35271	#44	6325	03 32 38.79 −27 47 10.9	28.44 ± 0.14	28.16	0.28
22832	#58	—	03 32 39.40 −27 47 59.4	28.50 ± 0.15	28.58	-0.08

[D] Double. ⋆ star SBM03# 5, on image edge. [1] spectroscopic $z = 5.83$ (SBM03#1 in Stanway et al. 2004 ApJ 607, 704; SiD002 in Dickinson et al. 2004 ApJL 600, 99; GLARE 1042 in Stanway et al. 2004 ApJL 604, 13). [2] SiD025 (Dickinson et al. 2004) 42929 & fainter 42806.