Spectroscopic Study of White Dwarfs in the Southern Hemisphere

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1. Introduction

We present a brief report on a spectroscopic survey aimed at identifying white dwarfs in the Southern hemisphere from the SUPERBLINK proper motion database, similar to the survey in the Northern hemisphere discussed in Limoges et al. (2013, 2015). Our main goal here is simply to provide spectroscopic classification and data for the Montreal White Dwarf Database[1], and to contribute to the ongoing effort of confirming spectroscopically all white dwarf candidates in the Gaia survey. Details of our survey will be reported elsewhere.

2. Analysis

The observational data are presented in Table 1 where we provide for each object the name, Gaia source ID, trigonometric parallax (and uncertainty), optical $BVRI$ and near-infrared JHK_s photometry. Each white dwarf in this table has been confirmed spectroscopically using the SOAR 4 m telescope with the Goodman spectrograph (see Subasavage et al. 2017). The location of our objects in the Gaia M_G versus $(G_{\rm BP} - G_{\rm RP})$ color-magnitude diagram is displayed in Figure 1 together with data for the 100 pc sample from the Montreal White Dwarf Database.

We measured the physical parameters for each white dwarf in our sample using the photometric technique and model atmospheres decribed at length in Kilic et al. (2020). Our photometric fits are presented in the figures in Appendix, while the physical parameters are reported in Table 2.

[1]http://montrealwhitedwarfdatabase.org/

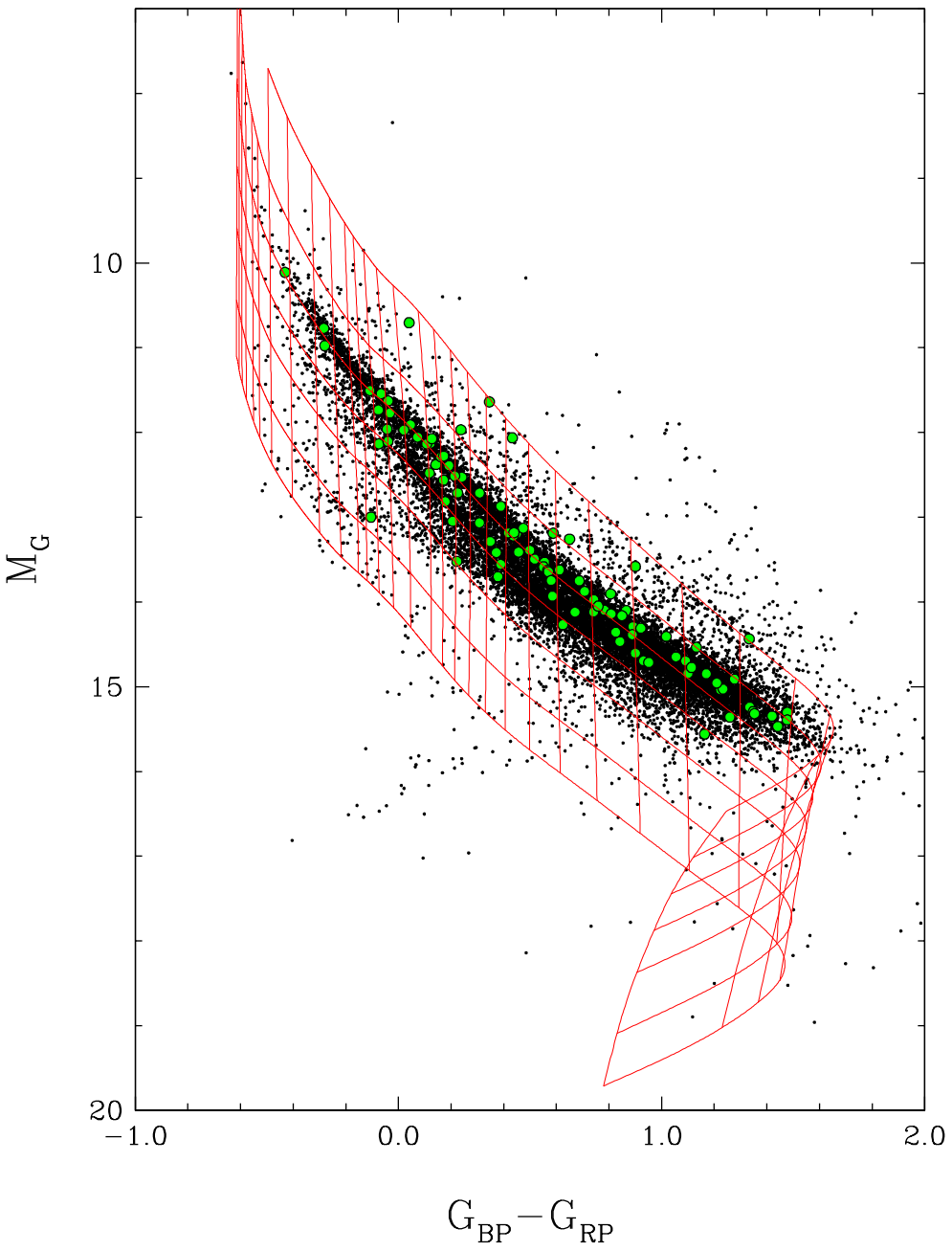

Fig. 1.— Gaia color-magnitude diagram of the 100 pc Montreal White Dwarf Database sample. Red lines show the cooling sequences for pure hydrogen atmosphere white dwarf models with 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, and 1.3 $M_{\odot}$ (from top to bottom). Our white dwarf sample is shown in green.

Table 1. Observational Results

Name	Gaia Source ID	π (mas)	σ_π (mas)	B	V	R	I	J	H	K_S
LEP0018−3501	2309122753616241280	27.969	0.074	16.716	16.374	16.120	15.832	15.640	15.565	15.800
LEP0034−6849	4703491116182416896	14.976	0.239	—	19.154	18.681	18.152	—	—	—
LEP0036−4157	4993117773313626496	38.815	0.062	17.155	16.614	16.208	15.856	15.430	15.181	15.125
LEP0041−5032	4926464691244602752	31.679	0.114	19.498	18.224	17.482	16.736	16.379	16.068	15.906
LEP0049−6833	4704295791186380032	19.319	0.198	20.285	19.114	18.504	17.960	—	—	—
LEP0101−3518	5002258941188997632	15.171	0.081	17.028	16.843	16.727	16.660	16.598	16.148	15.442
LEP0103−7254	4687409663432287488	8.319	0.055	15.332	15.495	15.644	15.802	16.117	16.370	15.389
LEP0109−5256	4927120378131194496	31.679	0.114	16.243	16.008	15.881	15.589	15.675	15.498	14.946
LEP0130−7349	4686195252815125888	17.674	0.057	16.945	16.694	16.527	16.316	16.139	15.272	15.895
LEP0135−5443	4912427947846613760	21.040	0.030	15.710	15.515	15.488	15.421	15.532	15.525	15.303
LEP0245−6038	4725152392894633984	28.152	0.065	17.468	17.014	16.651	16.333	15.834	15.472	15.669
LEP0257−3027	5065010887285008128	25.831	0.084	17.298	16.899	16.640	16.287	15.952	15.696	15.324
LEP0313−5607	4733604373137759616	28.684	0.024	14.760	14.596	14.604	14.582	14.636	14.625	14.635
LEP0316−8014	4620280217923548800	28.001	0.034	16.319	16.029	15.826	15.604	15.373	15.388	15.249
LEP0328−3238	5053839127592396032	32.465	0.093	18.723	17.654	17.099	16.546	15.933	15.491	15.613
LEP0339−4046	4849221800369242368	14.788	0.038	16.096	15.852	15.695	15.453	15.321	15.236	15.231
LEP0340−3015	5055975238166788352	19.306	0.051	16.125	15.947	15.872	15.762	15.843	15.777	15.578
LEP0340−3610	4860061541910268160	29.072	0.057	17.549	16.950	16.559	16.169	15.709	15.488	15.408
LEP0343−5125	4829340465475546880	35.859	0.033	16.258	15.884	15.651	15.371	15.068	15.004	14.924
LEP0355−5611	4683172420470864256	30.289	0.059	17.651	17.090	16.655	16.127	16.054	15.536	15.442
LEP0402−4037	4842472688760384384	22.084	0.030	15.588	15.412	15.357	15.289	15.314	15.302	15.251
LEP0412−4510	4837423353408638080	18.555	0.029	15.230	15.126	15.184	15.228	15.345	15.132	15.113
LEP0418−5004	4782553840532147840	41.890	0.075	18.623	17.516	16.941	16.329	16.042	15.852	15.782
LEP0426−4153	4839901583898106496	28.997	0.055	17.450	16.942	16.635	16.282	15.856	15.700	15.617
LEP0435−6105	4677461862018523776	39.539	0.061	18.379	17.328	16.736	16.291	15.702	15.212	15.099
LEP0445−4232	4815192671404177280	36.637	0.032	16.186	15.826	15.568	15.300	14.950	14.843	14.740
LEP0451−7302	4652838475220068992	20.956	0.057	17.057	16.648	16.431	16.145	15.789	15.469	15.032
LEP0457−6410	4664651250184794368	19.418	0.075	17.287	17.051	16.824	16.588	16.251	16.149	15.913
LEP0524−4641	4798944672685041152	18.404	0.038	16.421	16.231	16.107	15.971	15.892	16.001	15.585
LEP0539−6641	4659528969150132096	13.427	0.045	16.375	16.200	16.216	15.990	16.115	16.125	15.594
LEP0610−6542	5284364281664934784	17.972	0.093	18.344	17.849	17.511	17.182	—	—	—
LEP0618−8011	5210778263380292096	27.970	0.031	14.980	14.854	14.887	14.936	15.036	15.307	14.995
LEP0619−4143	5571715735704543360	23.528	0.040	15.646	15.457	15.367	15.280	15.304	15.125	15.186
LEP0710−4144	5561160355360035456	17.727	0.034	15.972	15.768	15.785	15.745	15.783	15.771	15.124
LEP0733−4453	5510964144860346496	25.582	0.033	15.582	15.395	15.311	15.230	15.092	15.070	15.537
LEP0753−5114	5513896164414899456	30.531	0.032	15.807	15.649	15.548	15.424	15.360	15.416	15.385
LEP0816−4641	5516345223493485952	43.423	0.074	18.828	17.624	16.967	16.358	15.678	15.592	14.912
LEP0825−5107	5322552760038496512	37.437	0.059	18.081	17.245	16.759	16.279	15.677	15.337	15.253
LEP0837−5017	5322090003089341440	31.533	0.033	14.737	14.582	14.620	14.596	14.768	14.856	14.802
LEP0859−3647	5622626147732121856	22.674	0.036	15.703	15.495	15.421	15.312	15.322	15.347	15.019
LEP0959−5027AB	5405389966089801984	26.445	0.059	16.864	16.489	16.170	15.838	15.461	15.199	14.816
LEP1019−3402	5446784345474819968	36.157	0.062	17.071	16.569	16.274	16.018	15.915	15.528	15.463
LEP1037−4412	5367774809996936960	25.570	0.089	17.851	17.289	16.955	16.554	16.060	16.065	15.879
LEP1046−4146	5391794195555570048	35.370	0.047	16.353	15.969	15.735	15.476	15.222	15.081	14.962
LEP1228−4236	6146335287066965376	21.648	0.074	15.215	15.050	15.077	15.110	15.212	15.273	15.223
LEP1240−3922	6153102609338147712	18.413	0.062	15.328	15.177	15.239	15.325	15.502	15.445	15.366
LEP1240−3932	6153086047944513664	21.748	0.074	15.930	15.835	15.742	15.666	15.561	15.691	15.699
LEP1257−5554B	6061504116720537472	22.530	0.066	17.084	16.637	16.347	16.066	—	—	—

Table 1—Continued

Name	Gaia Source ID	π (mas)	σ_π (mas)	B	V	R	I	J	H	K_S
LEP1317−5438	6067215083178616704	40.643	0.058	16.812	16.273	15.896	15.535	15.101	14.761	14.653
LEP1318−3155	6181301646614894976	14.079	0.115	16.663	16.369	16.196	15.965	15.773	15.636	15.936
LEP1320−6650	5857657615896064000	15.673	0.066	16.255	15.995	15.955	15.848	15.993	15.626	15.654
LEP1333−3705	6162813873991704960	24.872	0.087	17.223	16.851	16.594	16.335	15.992	15.707	15.705
LEP1351−3912	6111462202451873152	20.790	0.135	17.814	17.153	16.769	16.389	15.983	15.659	15.843
LEP1407−0626	3643555726544985088	40.639	0.039	15.305	15.074	14.939	14.798	14.705	14.547	14.621
LEP1443−1437	6310804634396281984	34.886	0.079	16.736	16.340	16.047	15.798	15.521	15.435	15.507
LEP1447−6940	5799644049485006848	33.751	0.079	18.147	17.076	16.486	15.983	15.297	15.044	15.180
LEP1514−4625	5903884280152869632	44.141	0.040	15.382	15.135	14.946	14.790	14.712	14.609	14.650
LEP1519−4854	5902612969841664768	28.258	0.045	15.731	15.617	15.495	15.420	15.317	15.450	15.355
LEP1551−3850	6008581907636919936	28.122	0.098	18.316	17.655	17.231	16.809	—	—	—
LEP1601−3832	5998095590373665792	30.565	0.112	18.230	17.359	16.871	16.404	15.889	15.857	15.587
LEP1656−8306	5767963511695922816	20.193	0.061	17.000	16.702	16.562	16.193	15.828	15.647	15.572
LEP1700−6908	5808208420421074560	27.833	0.054	16.827	16.571	16.402	16.216	15.927	16.110	15.800
LEP1714−0534	4361621688038664064	38.244	0.045	14.866	14.627	14.591	14.455	14.505	14.474	14.329
LEP1742−6505	5909078751020702080	33.328	0.055	16.093	15.969	15.843	15.715	15.639	15.619	15.455
LEP1746−6251	5909739660590724224	29.008	0.060	16.272	15.981	15.779	15.566	15.330	15.139	15.063
LEP1747−5436	5920900901901635968	73.983	0.069	—	16.279	15.662	15.097	14.458	14.222	14.287
LEP1803−3717	4037085334973293824	37.830	0.090	17.674	16.959	16.568	16.151	15.738	15.229	15.216
LEP1803−7523	6414612172876713472	31.999	0.087	17.608	17.039	16.647	16.398	15.848	15.604	15.233
LEP1820−3339	4044649768760867712	19.850	0.073	15.730	15.503	15.401	15.274	15.240	15.190	15.158
LEP1822−6537	6437614815119680768	27.907	0.103	18.644	17.780	17.295	16.837	16.419	15.878	15.596
LEP1837−7659	6365271657299575680	11.420	0.042	15.658	15.456	15.498	15.468	15.343	15.474	15.447
LEP1838−4416	6709854989379725056	29.546	0.125	18.130	17.439	17.040	16.630	16.133	15.455	15.668
LEP1857−2650B	4073522222505044224	25.331	0.074	16.834	16.486	16.270	16.006	15.684	15.512	15.543
LEP1911−2729	6763036202147206912	28.848	0.053	14.704	14.715	14.659	14.664	14.764	14.731	14.934
LEP1911−3820	6718079679950008704	35.941	0.181	19.131	17.933	17.308	16.658	15.994	15.793	15.616
LEP1936−3307	6744823139928811008	24.411	0.101	17.773	17.347	17.014	16.725	16.231	16.007	15.632
LEP1944−3603	6740493675455190784	33.882	0.078	14.208	14.041	14.086	14.118	14.228	14.232	14.388
LEP1945−4904A	6671045050707117568	29.003	0.179	19.544	18.372	17.697	17.171	16.485	16.107	17.112
LEP2003−4748	6670827416123874688	32.778	0.096	17.170	16.618	16.278	15.933	15.496	15.310	15.319
LEP2006−4355	6673731810450381056	25.317	0.061	15.936	15.729	15.629	15.526	15.560	15.409	15.512
LEP2007−6734	6424223313252632576	26.025	0.061	16.829	16.536	16.328	16.151	15.838	15.814	15.448
LEP2012−7036	6422387644229686272	21.939	0.152	17.861	17.335	16.951	16.555	16.110	16.093	15.565
LEP2027−4301	6679105566157898880	47.060	0.091	18.464	17.505	16.900	16.462	15.849	15.606	15.607
LEP2029−6434	6429465338016396928	26.738	0.060	16.606	16.370	16.180	15.941	15.934	15.925	15.471
LEP2101−4906B	6478328218869704192	74.892	0.040	16.314	15.485	15.021	14.565	14.127	13.858	13.839
LEP2118−3834A	6583364702110944384	23.458	0.079	16.739	16.431	16.225	16.027	15.757	15.603	15.704
LEP2138−4041	6578616598584224640	30.732	0.067	13.471	13.526	13.623	13.725	14.010	14.036	14.082
LEP2140−3637	6589369272547881856	25.168	0.095	15.963	15.994	16.026	16.047	16.212	16.134	15.724
LEP2153−3817	6585092962590585856	23.596	0.134	17.270	16.851	16.575	16.294	15.953	15.819	15.753
LEP2204−3127	6613289285448236288	40.579	0.095	18.145	17.145	16.627	16.159	15.574	15.292	15.478
LEP2206−6001	6409446323650635264	26.764	0.115	18.702	17.782	17.293	16.840	16.424	16.083	15.578
LEP2236−4329	6520844168856463104	32.919	0.067	16.756	16.313	15.996	15.666	15.288	15.050	15.280
LEP2302−3309	6554977369168846720	27.923	0.158	—	18.176	17.578	16.993	16.423	15.908	15.897
LEP2303−3710	6552878165248320896	30.768	0.145	19.539	18.279	17.674	16.991	16.451	16.266	16.099
LEP2331−6656	6389551313580046464	25.314	0.054	16.514	16.223	16.037	15.840	15.630	15.402	15.585
LEP2337−4110	6537005065634429312	13.261	0.062	15.116	15.170	15.259	15.326	15.571	15.616	15.701

Table 1—Continued

Name	Gaia Source ID	π (mas)	σ_π (mas)	B	V	R	I	J	H	K_S
LEP2344−8246	6350249717122200960	23.289	0.106	17.870	17.181	16.730	16.342	15.970	15.725	15.530
LEP2352−4611	6530655695221843456	16.032	0.074	16.691	16.503	16.432	16.226	16.266	16.213	14.982
LTT9387B	6387649708219253248	47.414	0.036	13.662	13.571	13.548	13.499	13.595	13.639	13.664
NLTT1450	2555215995900584448	46.091	0.078	16.802	16.149	15.765	15.384	14.971	14.668	14.569
NLTT49374	6862687522250677376	43.792	0.064	16.885	16.286	15.890	15.492	14.982	14.793	14.795

Table 2. Physical Parameters

Name	Type	Composition	$T_{\rm eff}$ (K)	$\log g$	M ($M_\odot$)	D (pc)	Notes
LEP0018−3501	DAH	He/H=0	7091 (192)	8.086 (0.049)	0.645 (0.042)	35.75 (0.10)	1
LEP0034−6849	DC	He/H=0	5052 (193)	7.984 (0.097)	0.570 (0.082)	66.77 (1.06)	1
LEP0036−4157	DAZ	He/H=0	5854 (99)	8.175 (0.036)	0.697 (0.032)	25.76 (0.04)	
LEP0041−5032	DC	He/H=0	4087 (73)	7.573 (0.052)	0.350 (0.032)	31.57 (0.12)	1
LEP0049−6833	DC	He/H=0	4500 (69)	7.897 (0.047)	0.516 (0.039)	51.76 (0.53)	1
LEP0101−3518	DA	He/H=0	9538 (452)	8.255 (0.074)	0.758 (0.066)	65.91 (0.35)	1
LEP0103−7254	DA	He/H=0	26405 (2916)	7.911 (0.106)	0.590 (0.077)	120.21 (0.80)	1
LEP0109−5256	DA	He/H=0	8189 (277)	8.383 (0.051)	0.840 (0.045)	31.57 (0.12)	
LEP0130−7349	DA	He/H=0	7937 (291)	7.918 (0.067)	0.547 (0.053)	56.58 (0.19)	1
LEP0135−5443	—	He/H=0	10290 (404)	8.044 (0.058)	0.627 (0.049)	47.53 (0.07)	1
LEP0245−6038	DA	He/H=0	6157 (135)	8.126 (0.046)	0.667 (0.040)	35.52 (0.08)	1
LEP0257−3027	DA	He/H=0	6513 (160)	8.097 (0.048)	0.650 (0.041)	38.71 (0.12)	1
LEP0313−5607	DA	He/H=0	10759 (368)	7.975 (0.043)	0.588 (0.035)	34.86 (0.03)	1
LEP0316−8014	DA	He/H=0	7573 (226)	8.030 (0.052)	0.611 (0.045)	35.71 (0.04)	1
LEP0328−3238	DC	He/H=0	4663 (69)	7.779 (0.047)	0.452 (0.035)	30.80 (0.09)	
LEP0339−4046	DA	He/H=0	7910 (214)	6.987 (0.053)	0.201 (0.016)	67.62 (0.17)	1
LEP0340−3015	DA	He/H=0	9683 (368)	8.051 (0.062)	0.630 (0.052)	51.80 (0.14)	
LEP0340−3610	DA	He/H=0	5727 (103)	7.901 (0.045)	0.528 (0.035)	34.40 (0.07)	
LEP0343−5125	DA	He/H=0	6914 (159)	8.064 (0.041)	0.630 (0.036)	27.89 (0.03)	1
LEP0355−5611	DAH	He/H=0	5639 (104)	7.979 (0.046)	0.573 (0.039)	33.01 (0.06)	1
LEP0402−4037	DA	He/H=0	9953 (326)	7.958 (0.052)	0.576 (0.041)	45.28 (0.06)	1
LEP0412−4510	DA	He/H=0	12417 (785)	7.908 (0.044)	0.555 (0.033)	53.89 (0.08)	1
LEP0418−5004	DC	He/H=0	4611 (69)	8.058 (0.042)	0.614 (0.038)	23.87 (0.04)	1
LEP0426−4153	DAZ	He/H=0	6148 (128)	8.141 (0.043)	0.676 (0.038)	34.49 (0.06)	1
LEP0435−6105	DC	He/H=0	4745 (64)	7.942 (0.040)	0.543 (0.033)	25.29 (0.04)	
LEP0445−4232	DA	He/H=0	6823 (150)	8.008 (0.041)	0.596 (0.034)	27.29 (0.03)	1
LEP0451−7302	DA	He/H=0	6792 (189)	7.722 (0.058)	0.440 (0.040)	47.72 (0.13)	1
LEP0457−6410	DA	He/H=0	7502 (263)	8.143 (0.060)	0.681 (0.053)	51.50 (0.20)	1
LEP0524−4641	DA	He/H=0	8956 (345)	7.972 (0.066)	0.581 (0.054)	54.34 (0.12)	
LEP0539−6641	DA	He/H=0	9572 (381)	7.657 (0.071)	0.419 (0.045)	74.48 (0.25)	1
LEP0610−6542	DA	He/H=0	6182 (147)	8.058 (0.052)	0.624 (0.045)	55.64 (0.29)	1
LEP0618−8011	DA	He/H=0	12731 (762)	8.361 (0.041)	0.834 (0.035)	35.75 (0.04)	
LEP0619−4143	DA	He/H=0	9455 (281)	7.954 (0.048)	0.572 (0.039)	42.50 (0.07)	
LEP0710−4144	DAH	He/H=0	10720 (497)	8.064 (0.062)	0.641 (0.052)	56.41 (0.11)	1
LEP0733−4453	DA	He/H=0	9364 (316)	8.013 (0.055)	0.606 (0.046)	39.09 (0.05)	1
LEP0753−5114	DAH	He/H=0	9400 (331)	8.414 (0.051)	0.862 (0.045)	32.75 (0.04)	1
LEP0816−4641	DC	He/H=0	4353 (68)	7.950 (0.042)	0.547 (0.036)	23.03 (0.04)	1
LEP0825−5107	DC	He/H=0	5080 (74)	8.058 (0.040)	0.616 (0.035)	26.71 (0.04)	1
LEP0837−5017	DA	He/H=0	11946 (480)	8.280 (0.034)	0.780 (0.031)	31.71 (0.04)	1
LEP0859−3647	DA	He/H=0	9433 (302)	7.924 (0.053)	0.555 (0.042)	44.10 (0.07)	1
LEP0959−5027AB	DQ	log H/He=−5	5830 (139)	7.361 (0.061)	0.270 (0.028)	37.81 (0.09)	1
LEP1019−3402	DQ:	log H/He=−5	6047 (150)	8.150 (0.050)	0.666 (0.045)	27.66 (0.04)	1
LEP1037−4412	DAH:	He/H=0	5917 (121)	8.069 (0.047)	0.629 (0.041)	39.11 (0.14)	1
LEP1046−4146	—	He/H=0	6983 (169)	8.136 (0.043)	0.676 (0.038)	28.27 (0.04)	1
LEP1228−4236	DA	He/H=0	11764 (551)	8.032 (0.045)	0.624 (0.038)	46.19 (0.16)	1
LEP1240−3922	DA	He/H=0	13163 (796)	8.019 (0.044)	0.619 (0.037)	54.31 (0.18)	1
LEP1240−3932	DC/DQ	log H/He=−5	9088 (343)	7.852 (0.063)	0.495 (0.048)	45.98 (0.16)	1
LEP1257−5554B	DA	He/H=0	6521 (181)	7.694 (0.062)	0.425 (0.041)	44.38 (0.12)	1

Table 2—Continued

Name	Type	Composition	$T_{\rm eff}$ (K)	$\log g$	M ($M_\odot$)	D (pc)	Notes
LEP1317−5438	DA	He/H=0	5859 (107)	8.014 (0.042)	0.595 (0.035)	24.60 (0.04)	1
LEP1318−3155	DA	He/H=0	7632 (229)	7.189 (0.058)	0.247 (0.022)	71.03 (0.58)	1
LEP1320−6650	DA	He/H=0	9564 (390)	7.766 (0.072)	0.471 (0.051)	63.80 (0.27)	1
LEP1333−3705	DA	He/H=0	6840 (189)	8.150 (0.050)	0.684 (0.044)	40.21 (0.14)	1
LEP1351−3912	DA	He/H=0	5650 (100)	7.446 (0.049)	0.314 (0.026)	48.10 (0.31)	1
LEP1407−0626	DA	He/H=0	8510 (212)	8.233 (0.037)	0.742 (0.033)	24.61 (0.03)	
LEP1443−1437	DA	He/H=0	6822 (163)	8.292 (0.041)	0.777 (0.037)	28.66 (0.06)	
LEP1447−6940	DC	He/H=0	4638 (65)	7.315 (0.052)	0.255 (0.024)	29.63 (0.07)	1
LEP1514−4625	DQ	log H/He=−5	7538 (188)	8.012 (0.040)	0.583 (0.033)	22.65 (0.03)	1
LEP1519−4854	DQ	log H/He=−5	8881 (343)	8.049 (0.061)	0.608 (0.052)	35.39 (0.06)	1
LEP1551−3850	DC	He/H=0	5563 (104)	8.247 (0.045)	0.742 (0.042)	35.56 (0.12)	1
LEP1601−3832	DC	He/H=0	5101 (78)	7.846 (0.047)	0.491 (0.036)	32.72 (0.12)	1
LEP1656−8306	DA	He/H=0	7204 (238)	7.867 (0.064)	0.516 (0.050)	49.52 (0.15)	1
LEP1700−6908	DA	He/H=0	8016 (309)	8.508 (0.058)	0.922 (0.049)	35.93 (0.07)	1
LEP1714−0534	DA	He/H=0	9556 (257)	8.150 (0.040)	0.691 (0.034)	26.15 (0.03)	1
LEP1742−6505	DC	log H/He=−5	8553 (345)	8.429 (0.056)	0.855 (0.050)	30.01 (0.04)	1
LEP1746−6251	DA	He/H=0	7488 (224)	8.022 (0.053)	0.606 (0.045)	34.47 (0.07)	1
LEP1747−5436	DC	He/H=0	4505 (111)	7.951 (0.056)	0.548 (0.048)	13.52 (0.01)	
LEP1803−3717	DA	He/H=0	5534 (97)	8.215 (0.043)	0.721 (0.038)	26.43 (0.06)	1
LEP1803−7523	DA	He/H=0	5948 (114)	8.253 (0.040)	0.748 (0.037)	31.25 (0.08)	1
LEP1820−3339	DA	He/H=0	8962 (251)	7.579 (0.050)	0.383 (0.029)	50.38 (0.19)	1
LEP1822−6537	DC	He/H=0	5109 (80)	8.020 (0.046)	0.593 (0.039)	35.83 (0.13)	1
LEP1837−7659	DA	He/H=0	10202 (368)	7.080 (0.049)	0.237 (0.014)	87.56 (0.32)	1
LEP1838−4416	DA	He/H=0	5556 (99)	8.184 (0.044)	0.700 (0.040)	33.85 (0.14)	1
LEP1857−2650B	DA	He/H=0	7044 (195)	8.008 (0.051)	0.596 (0.043)	39.48 (0.12)	1
LEP1911−2729	DB	log H/He=−5	11232 (583)	7.992 (0.069)	0.578 (0.057)	34.66 (0.06)	1
LEP1911−3820	DC	He/H=0	4371 (68)	7.887 (0.045)	0.510 (0.037)	27.82 (0.14)	1
LEP1936−3307	DC	log H/He=−5	5951 (168)	8.010 (0.062)	0.578 (0.053)	40.97 (0.17)	1
LEP1944−3603	DA	He/H=0	11869 (485)	8.024 (0.035)	0.620 (0.030)	29.51 (0.06)	
LEP1945−4904A	DC	He/H=0	4438 (68)	7.930 (0.045)	0.535 (0.037)	34.48 (0.21)	1
LEP2003−4748	DA	He/H=0	5995 (112)	8.021 (0.041)	0.601 (0.035)	30.51 (0.09)	1
LEP2006−4355	DA	He/H=0	9366 (323)	8.219 (0.053)	0.734 (0.047)	39.50 (0.10)	
LEP2007−6734	DC	log H/He=−5	7070 (233)	8.033 (0.060)	0.595 (0.050)	38.42 (0.09)	1
LEP2012−7036	DC	log H/He=−5	5390 (127)	7.430 (0.067)	0.291 (0.034)	45.58 (0.31)	1
LEP2027−4301	DC	He/H=0	4866 (73)	8.404 (0.038)	0.845 (0.035)	21.25 (0.04)	1
LEP2029−6434	DQ	log H/He=−5	7352 (246)	8.042 (0.058)	0.601 (0.049)	37.40 (0.08)	1
LEP2101−4906B	DA	He/H=0	5293 (60)	8.060 (0.026)	0.619 (0.024)	13.35 (0.00)	
LEP2118−3834A	DA	He/H=0	7505 (235)	8.025 (0.056)	0.608 (0.048)	42.63 (0.14)	1
LEP2138−4041	DA	He/H=0	18442 (1141)	8.033 (0.046)	0.639 (0.037)	32.54 (0.07)	
LEP2140−3637	DQ	log C/He=−2.63	12035 (760)	8.673 (0.078)	1.014 (0.060)	39.73 (0.15)	1
LEP2153−3817	DA	He/H=0	6636 (171)	7.987 (0.051)	0.583 (0.043)	42.38 (0.24)	1
LEP2204−3127	DC	He/H=0	4889 (70)	7.987 (0.043)	0.571 (0.036)	24.64 (0.05)	1
LEP2206−6001	DC	He/H=0	5048 (78)	7.918 (0.046)	0.531 (0.038)	37.36 (0.16)	1
LEP2236−4329	DA	He/H=0	6321 (132)	7.959 (0.043)	0.565 (0.035)	30.38 (0.06)	1
LEP2302−3309	DC	He/H=0	4588 (167)	7.844 (0.093)	0.487 (0.073)	35.81 (0.21)	1
LEP2303−3710	DC	He/H=0	4302 (69)	7.847 (0.046)	0.487 (0.036)	32.50 (0.15)	1
LEP2331−6656	DA	He/H=0	7653 (226)	8.048 (0.051)	0.623 (0.044)	39.50 (0.09)	
LEP2337−4110	DB	log H/He=−5	16555 (1822)	7.839 (0.120)	0.504 (0.087)	75.41 (0.35)	

Table 2—Continued

Name	Type	Composition	$T_{\rm eff}$ (K)	$\log g$	M ($M_\odot$)	D (pc)	Notes
LEP2344−8246	DA	He/H=0	5487 (95)	7.533 (0.051)	0.346 (0.030)	42.94 (0.20)	1
LEP2352−4611	DA	He/H=0	9051 (375)	7.986 (0.071)	0.589 (0.059)	62.38 (0.29)	1
LTT9387B	DB	log H/He=−5	10370 (524)	7.787 (0.086)	0.465 (0.062)	21.09 (0.02)	
NLTT1450	DA	He/H=0	5665 (80)	8.027 (0.032)	0.602 (0.028)	21.70 (0.04)	
NLTT49374	DAZ	He/H=0	5670 (88)	8.026 (0.036)	0.602 (0.031)	22.84 (0.04)	

Note. — (1) New spectral classification .

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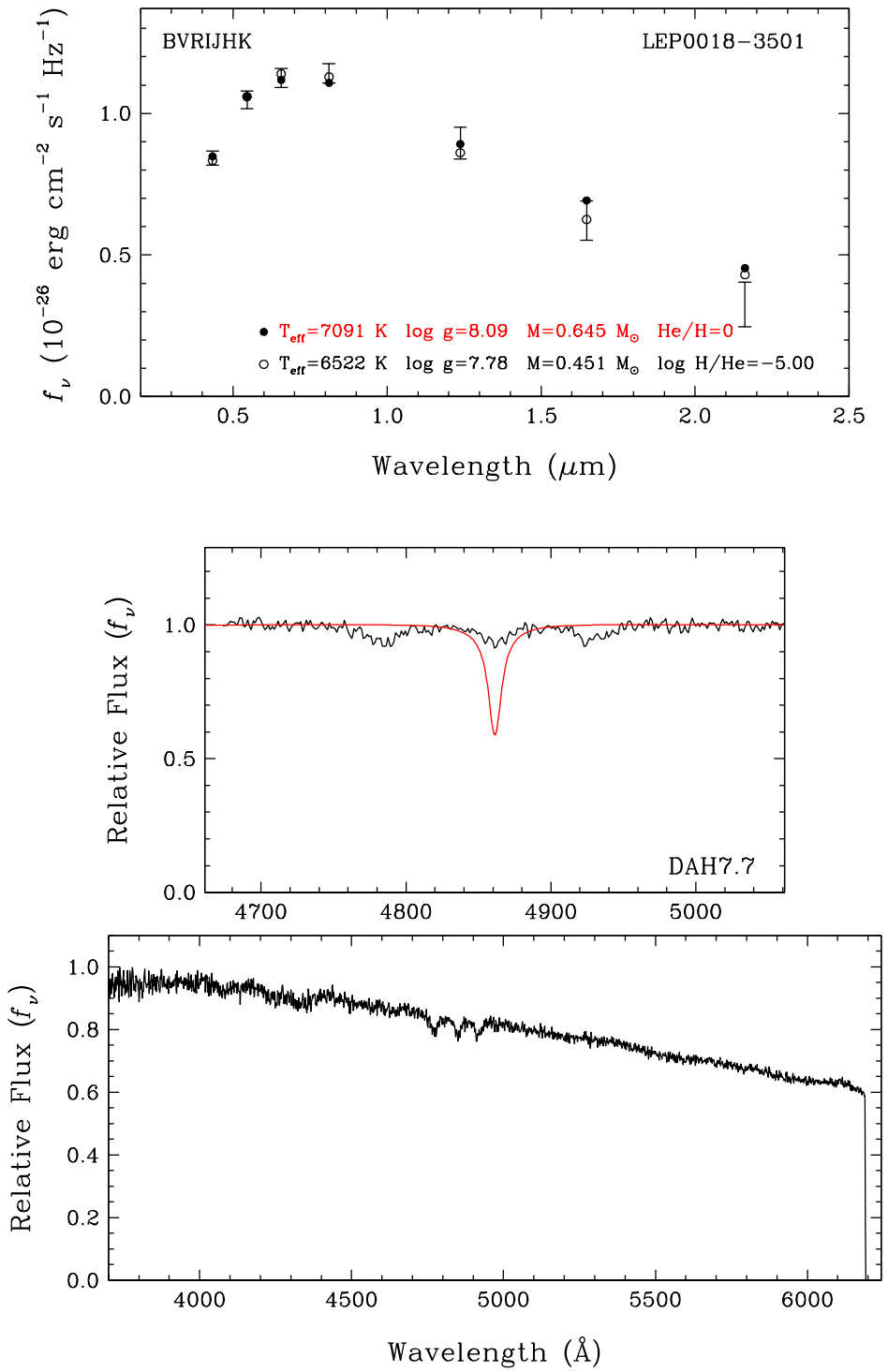


Fig. 2.— With the exception of DQ white dwarfs, the top panel shows the best-fitting pure hydrogen (filled dots) and helium-rich (open circles) atmosphere white dwarf models to the photometry (error bars) labeled at the top left; the atmospheric parameters of the favored solution are highlighted in red. The middle panels always show the predicted spectrum (red lines) based on the pure hydrogen solution. For DQ white dwarfs, the top and middle panels show our best fits using models including carbon. In all cases, the bottom panel shows the entire spectrum.

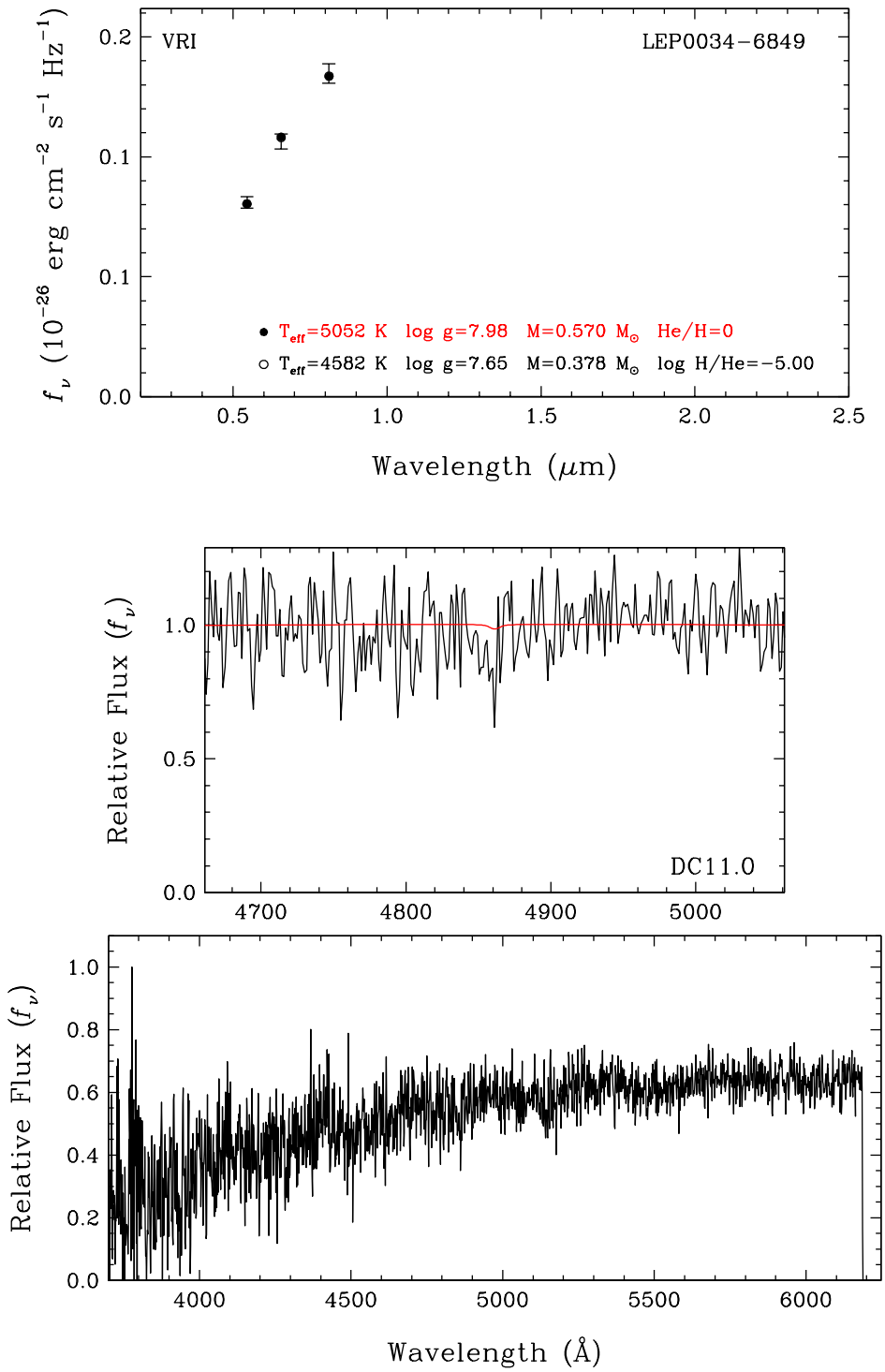


Fig. 3.— Same as Figure 2.

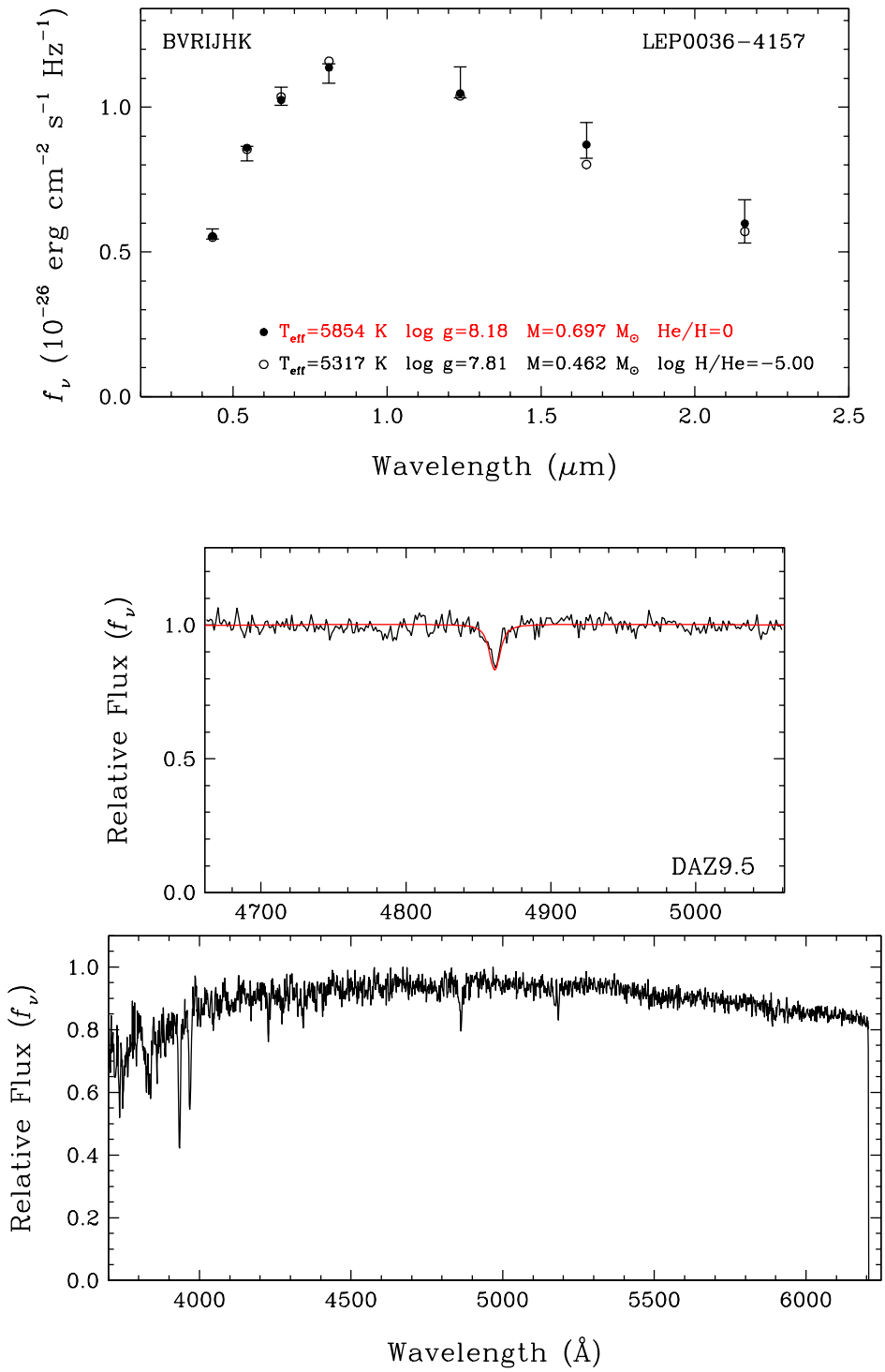


Fig. 4.— Same as Figure 2.

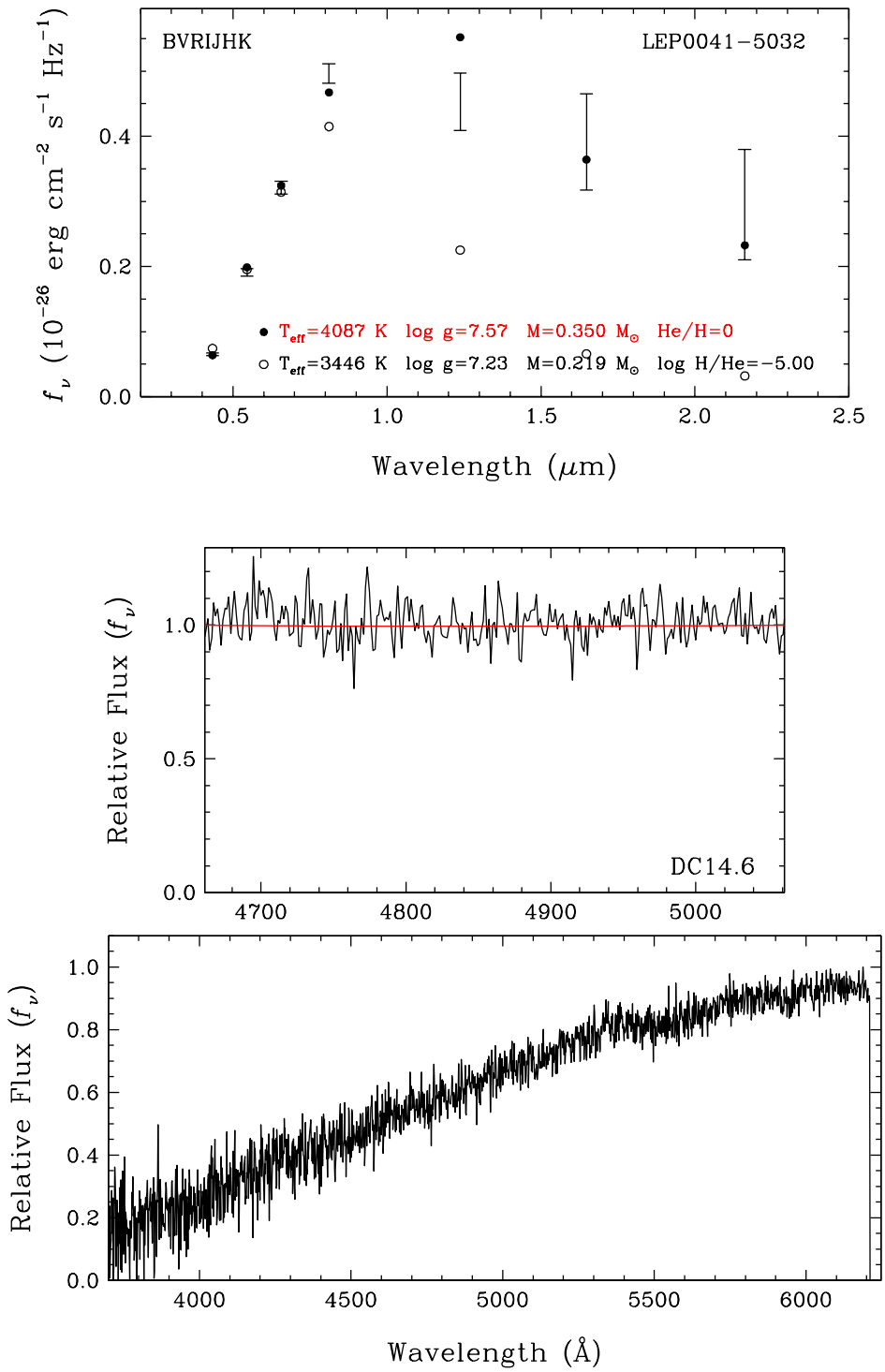


Fig. 5.— Same as Figure 2.

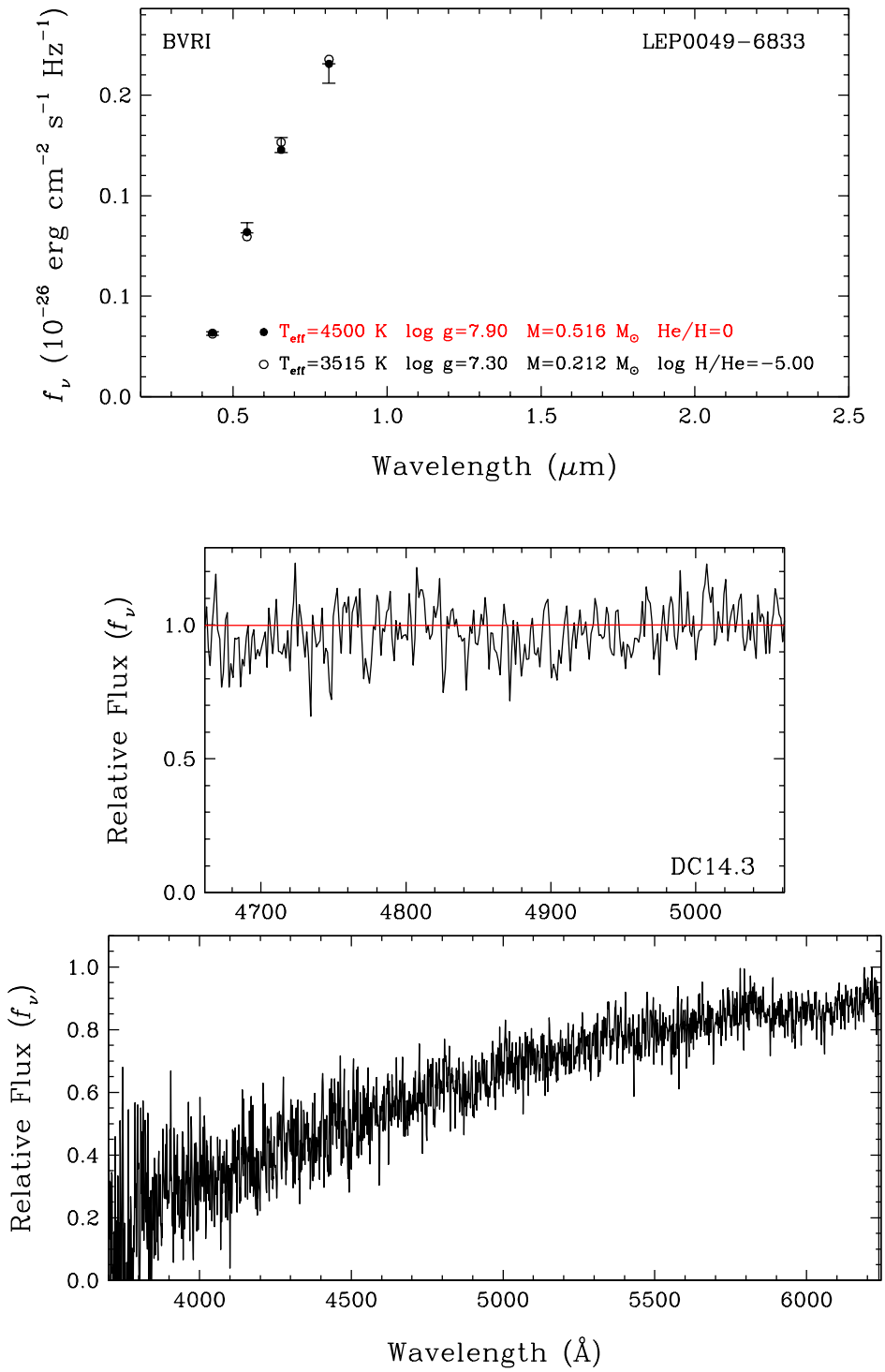


Fig. 6.— Same as Figure 2.

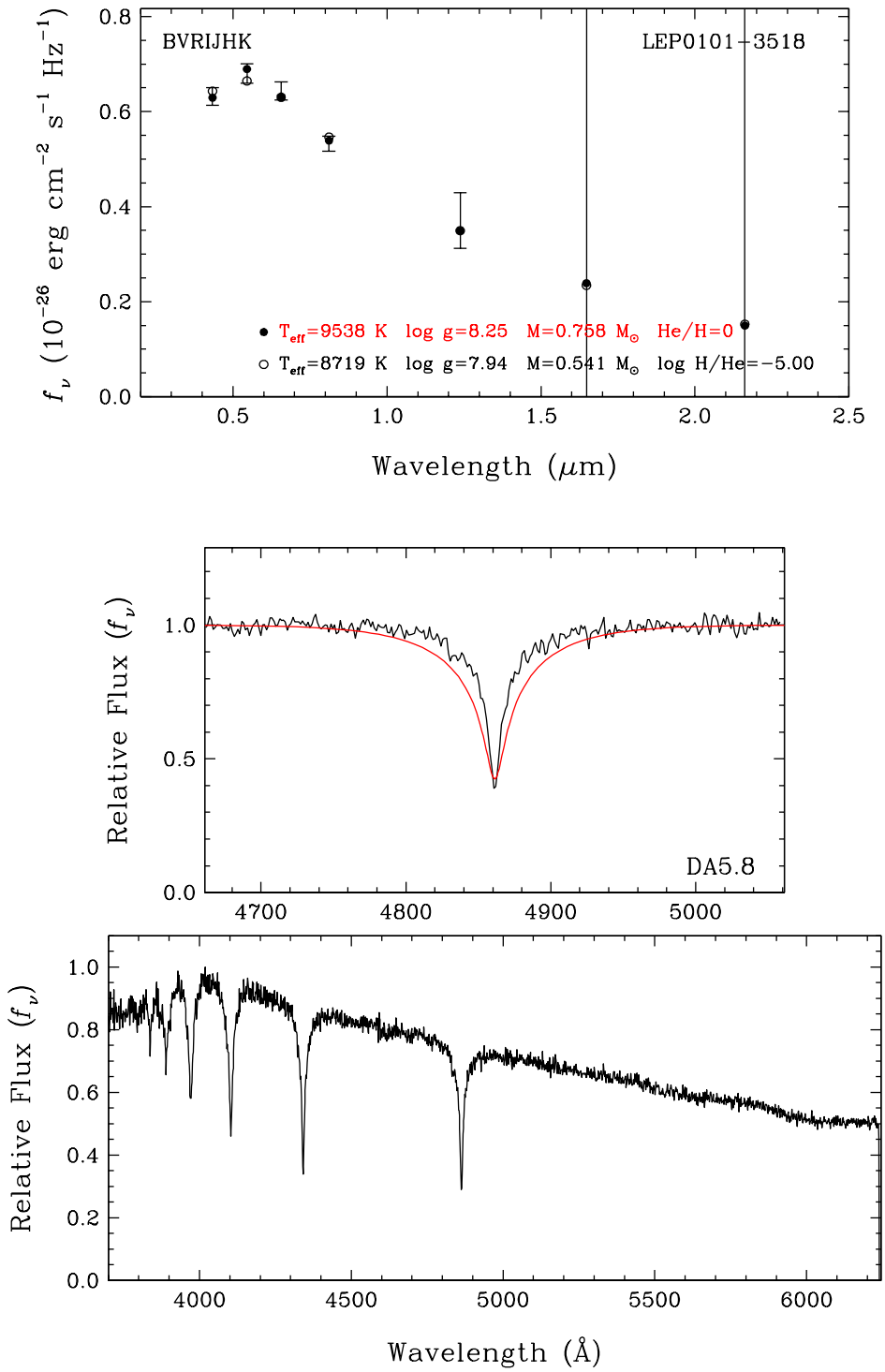


Fig. 7.— Same as Figure 2.

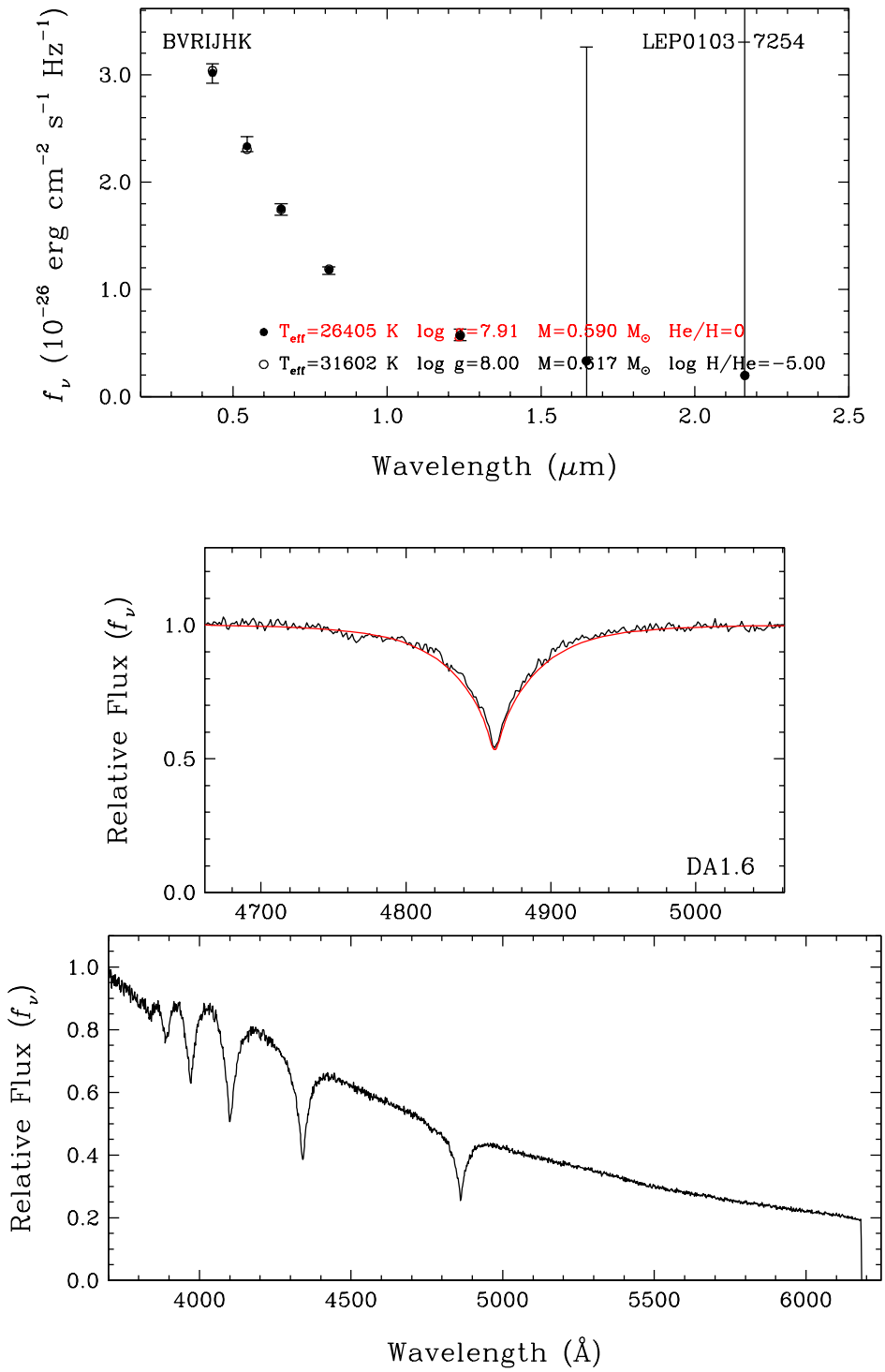
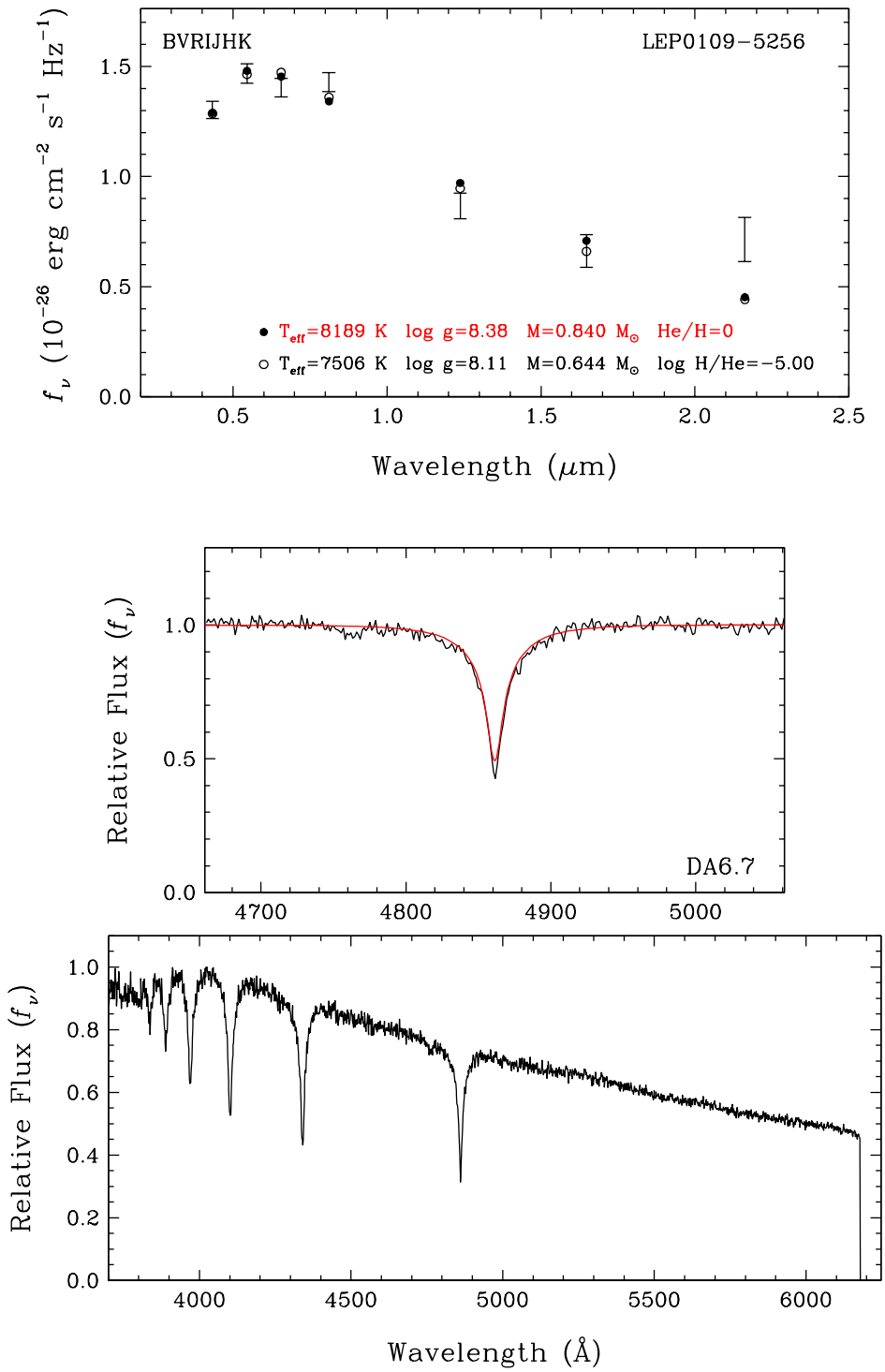


Fig. 8.— Same as Figure 2.



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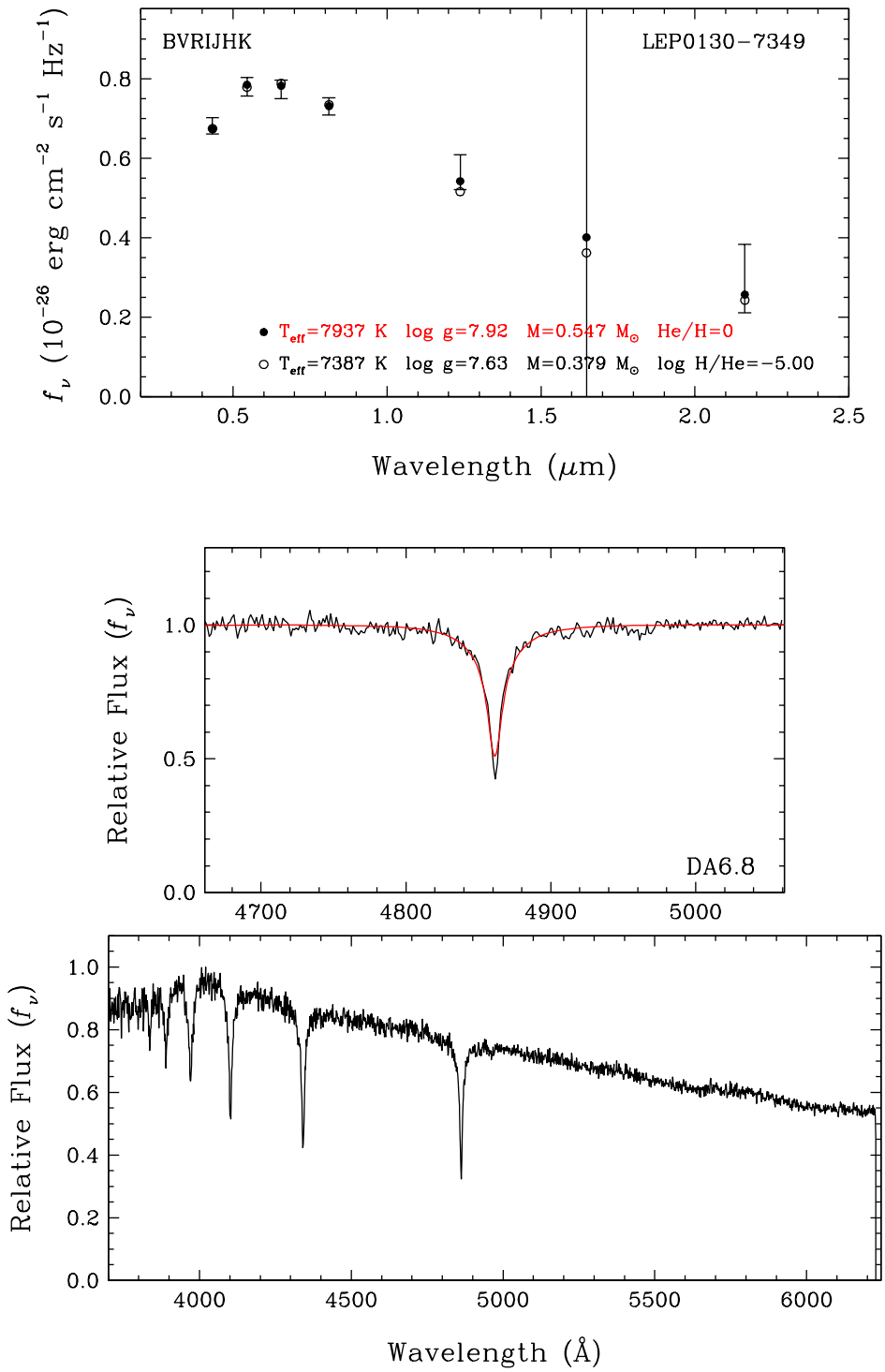


Fig. 10.— Same as Figure 2.

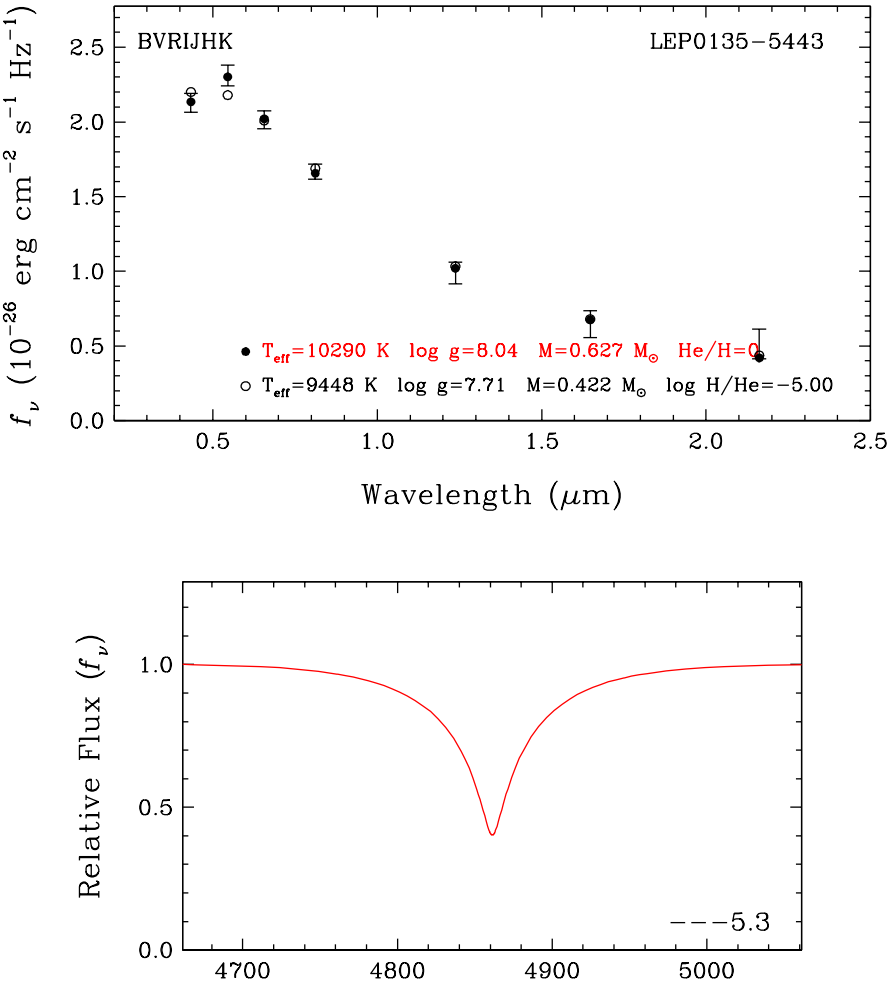


Fig. 11.— Same as Figure 2.

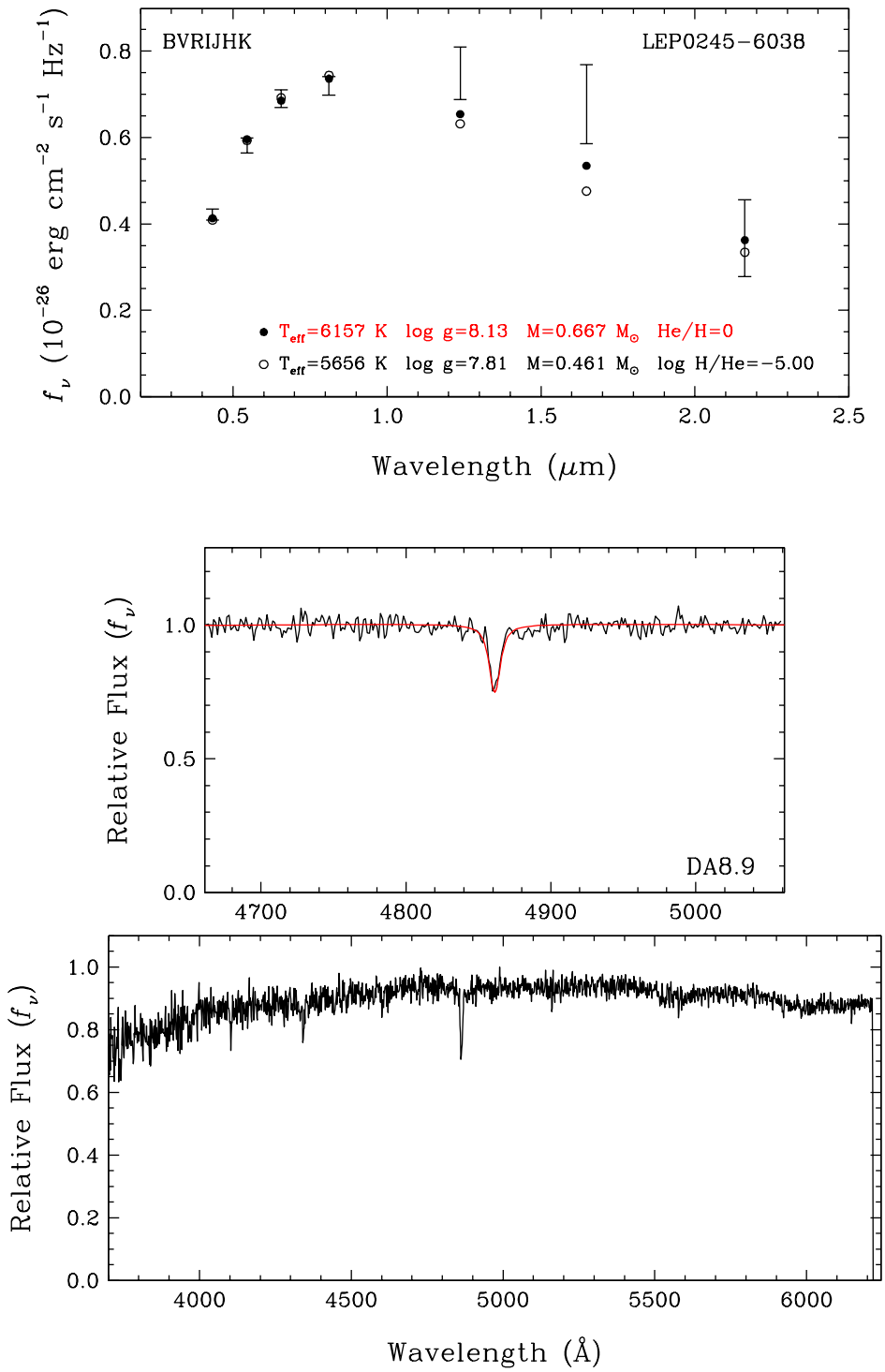
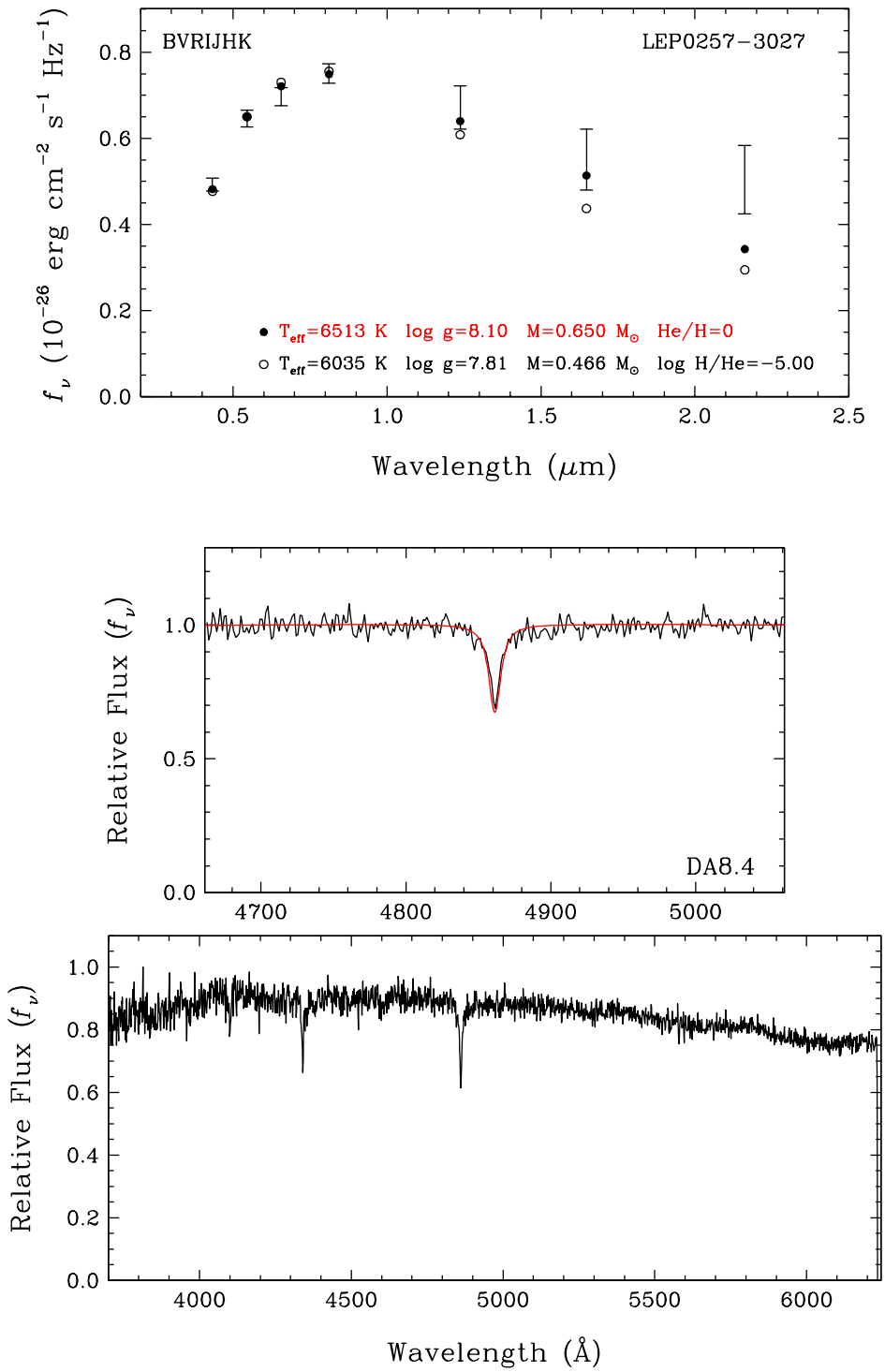


Fig. 12.— Same as Figure 2.



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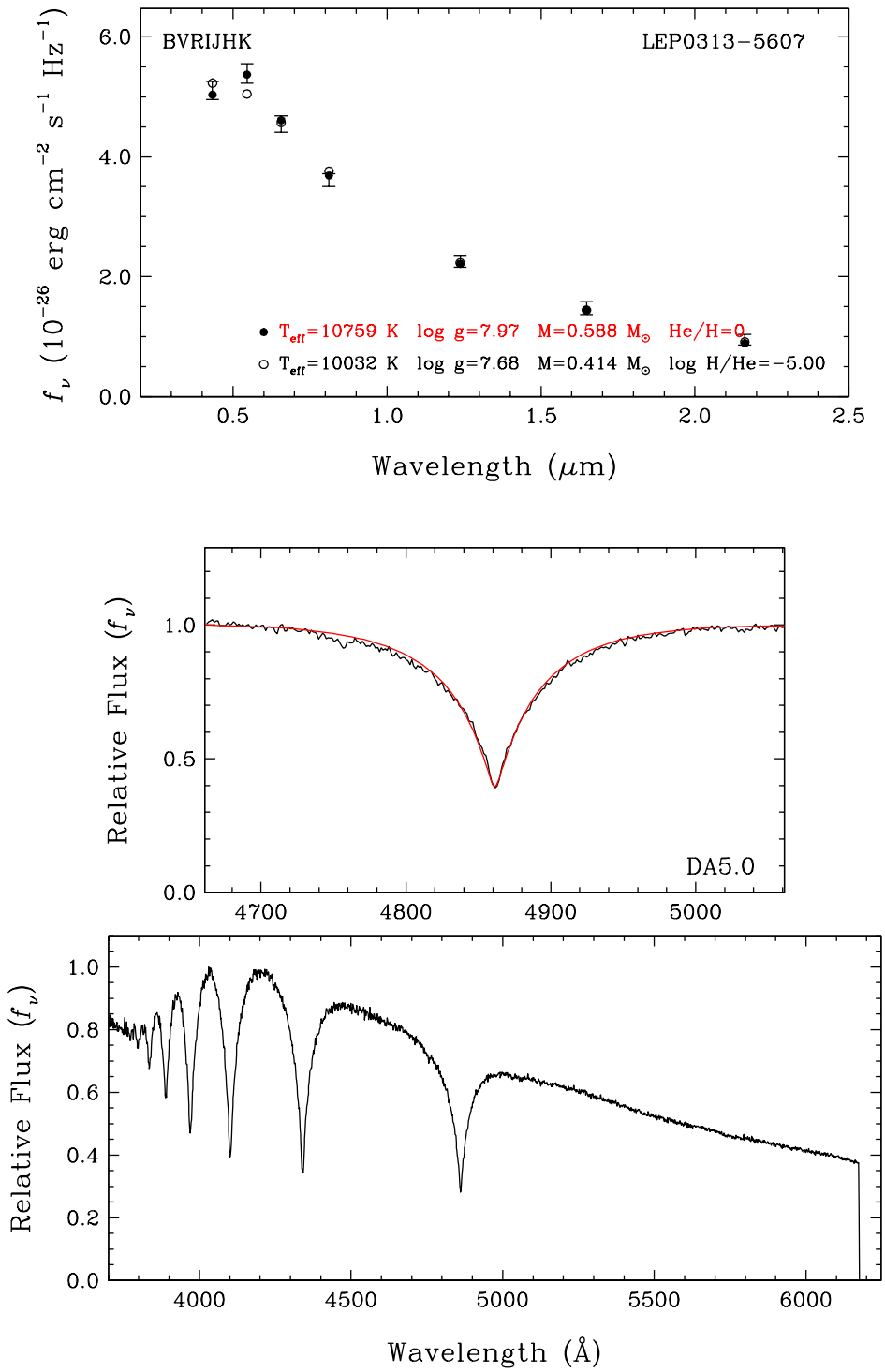


Fig. 14.— Same as Figure 2.

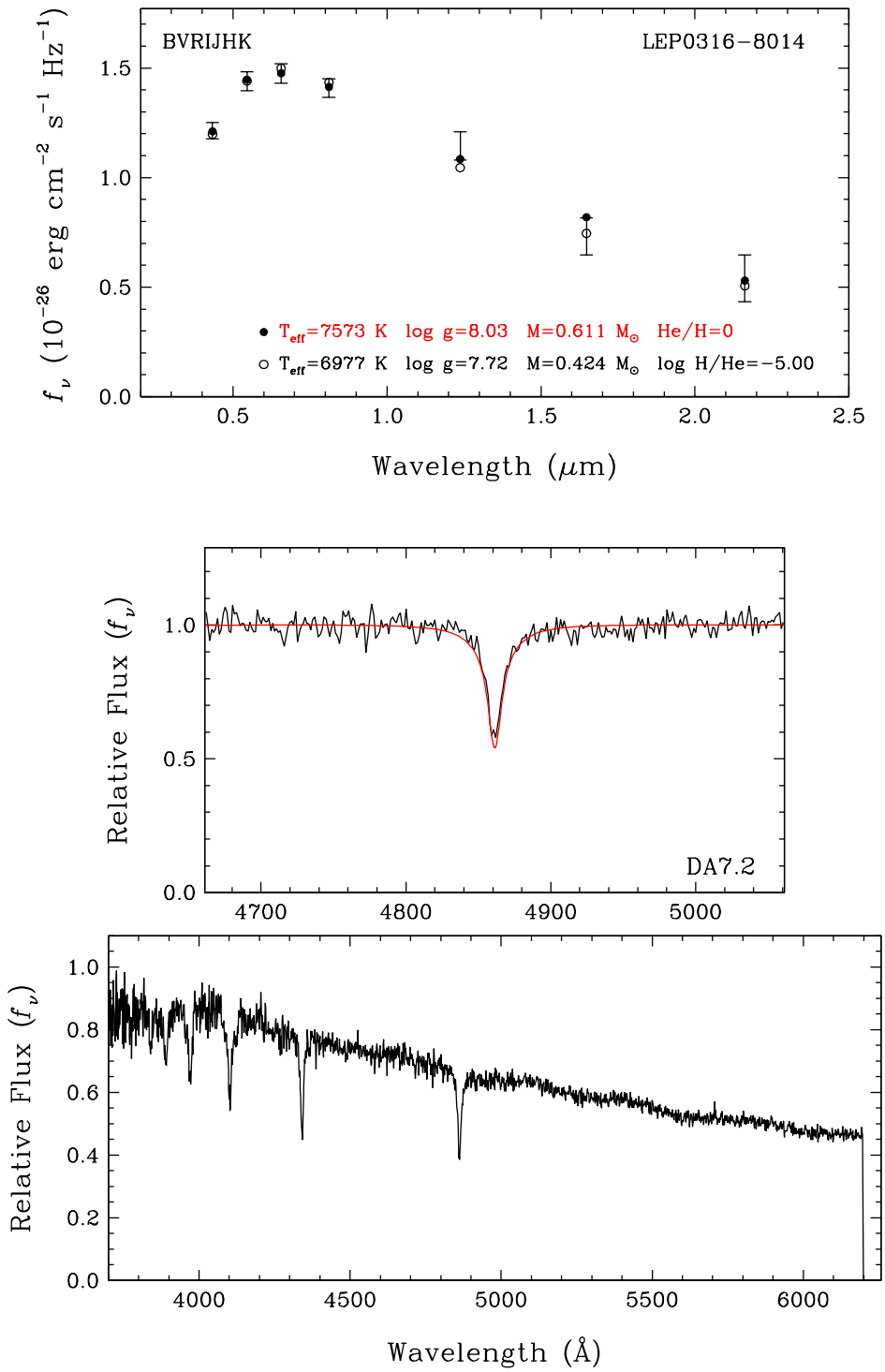


Fig. 15.— Same as Figure 2.

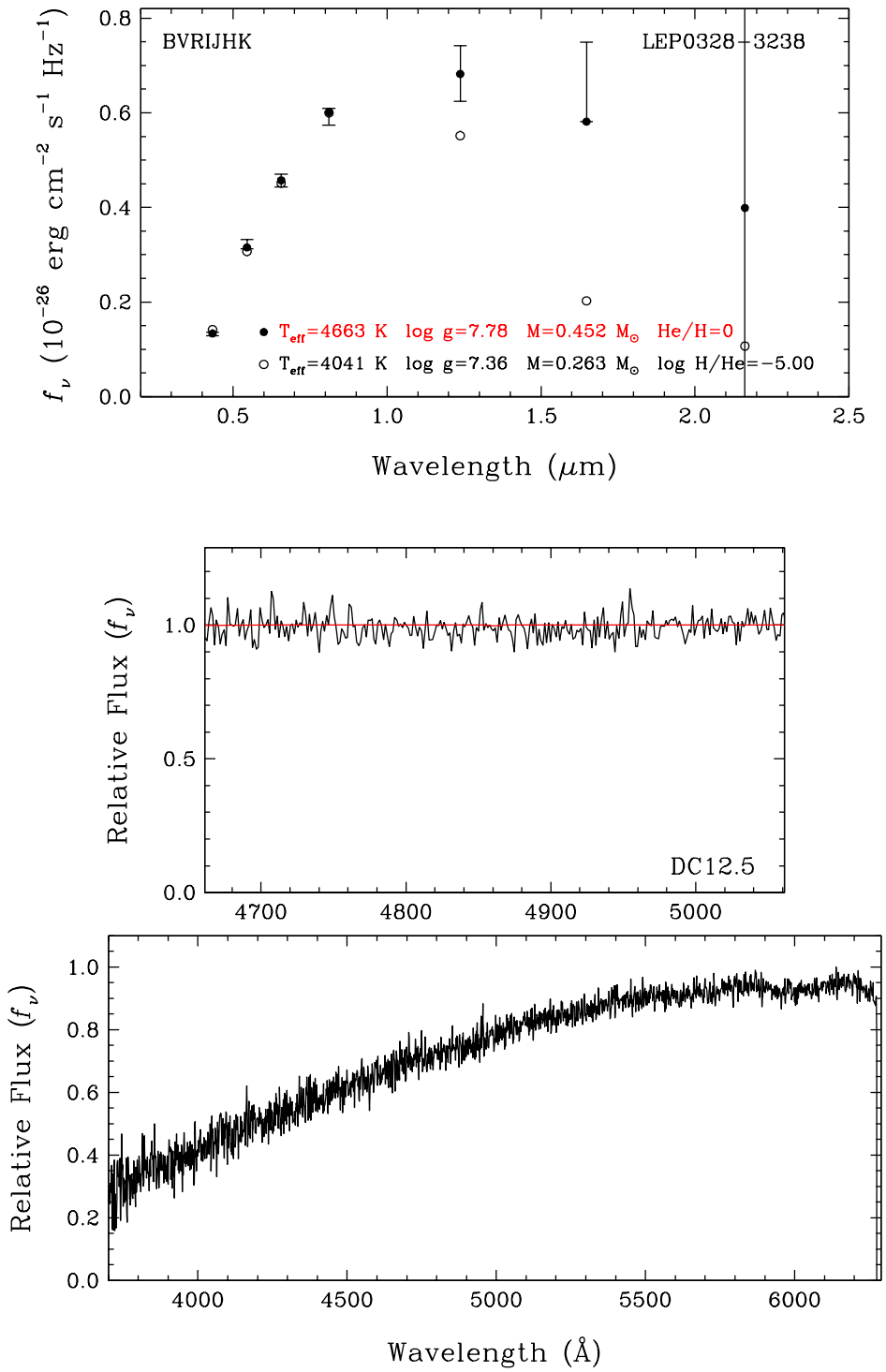
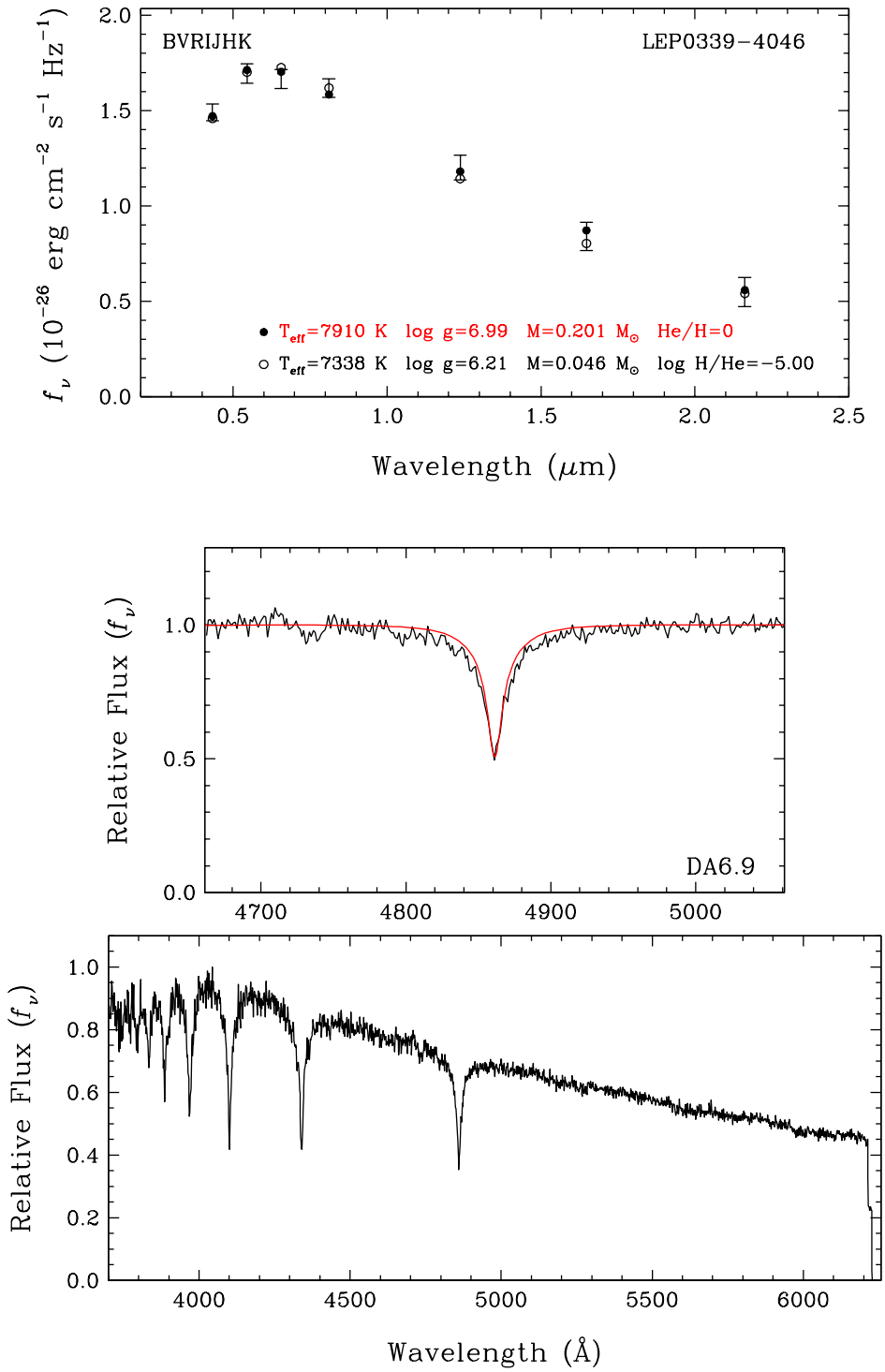


Fig. 16.— Same as Figure 2.



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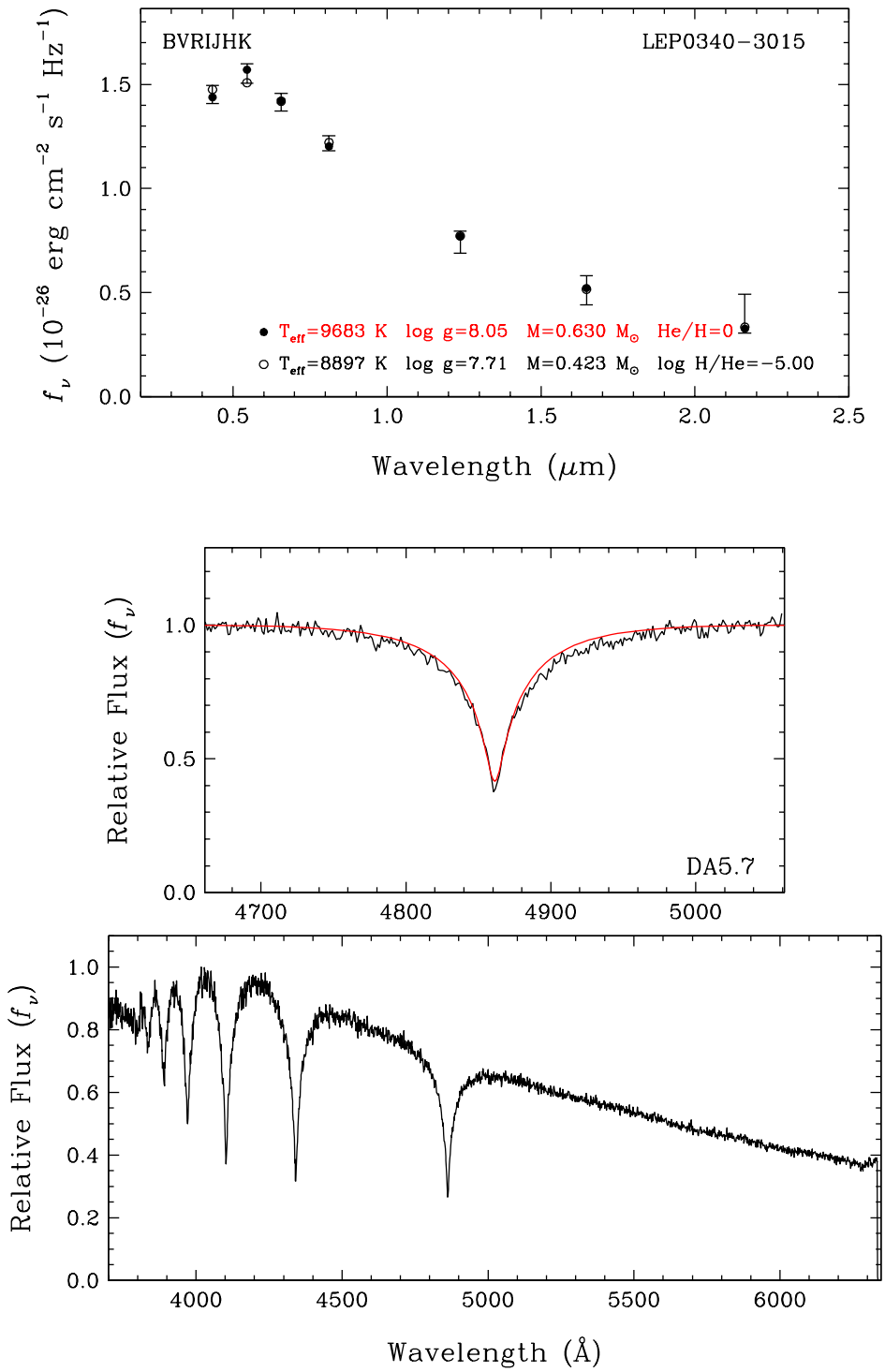
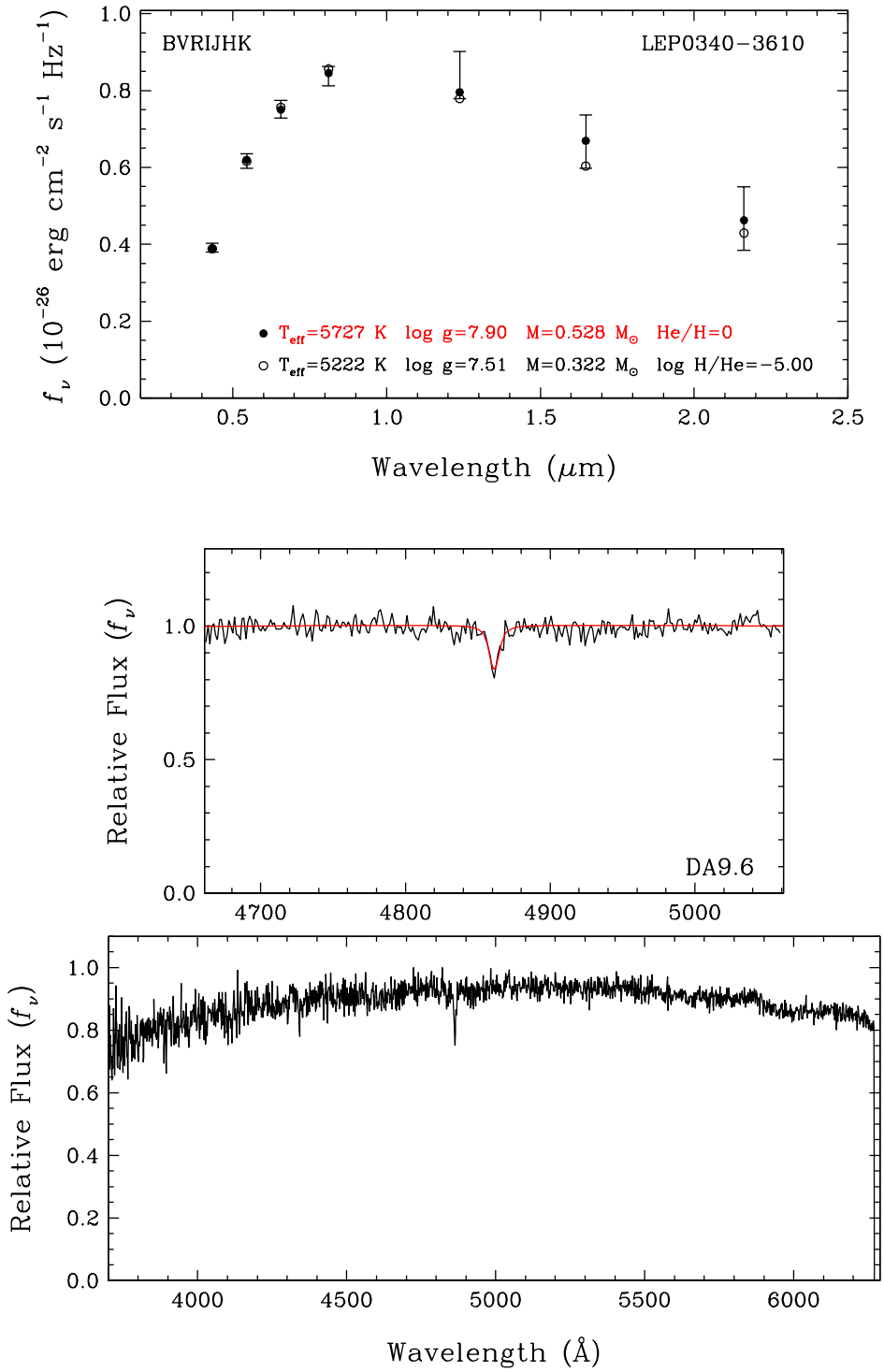


Fig. 18.— Same as Figure 2.



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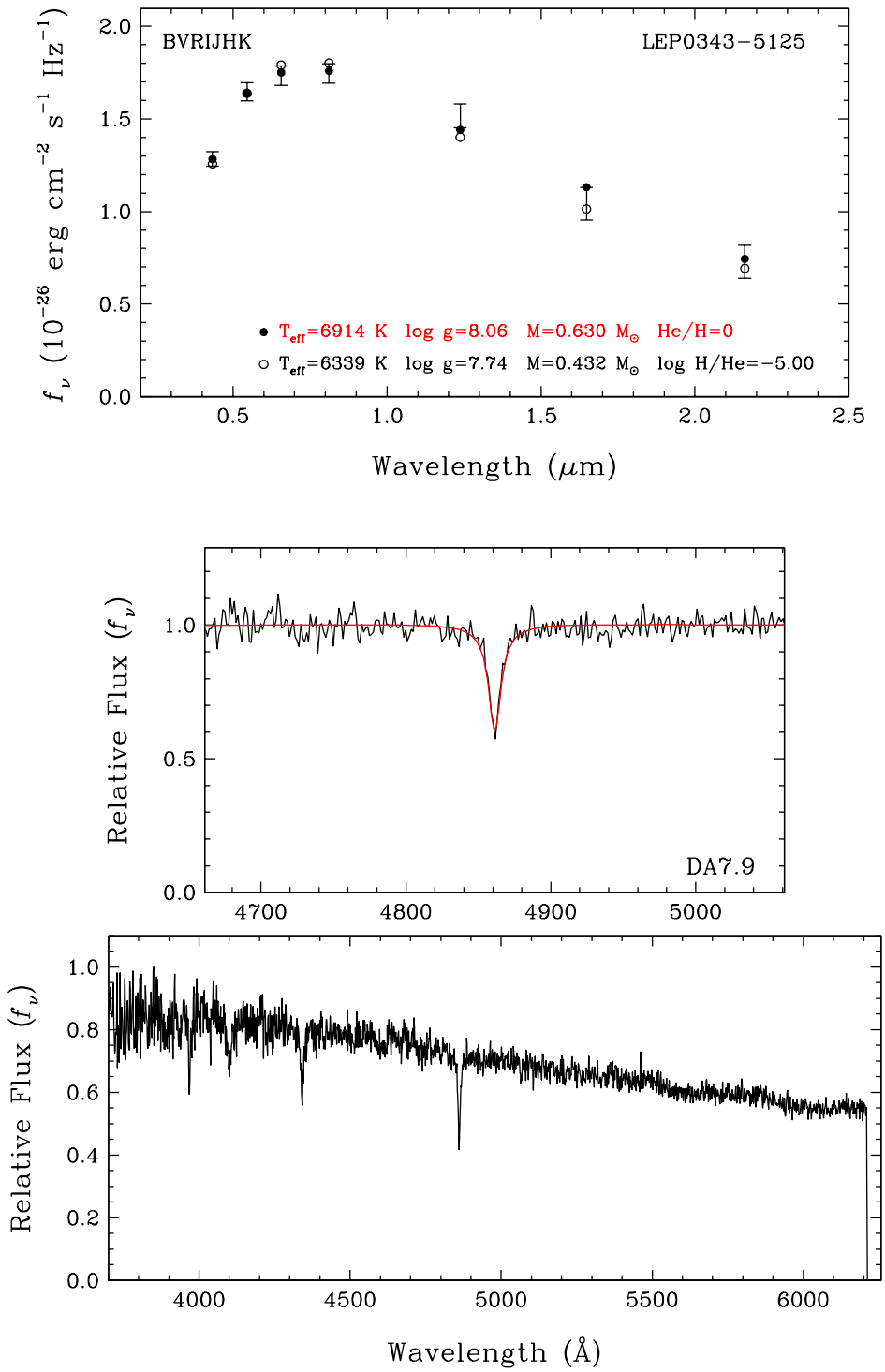

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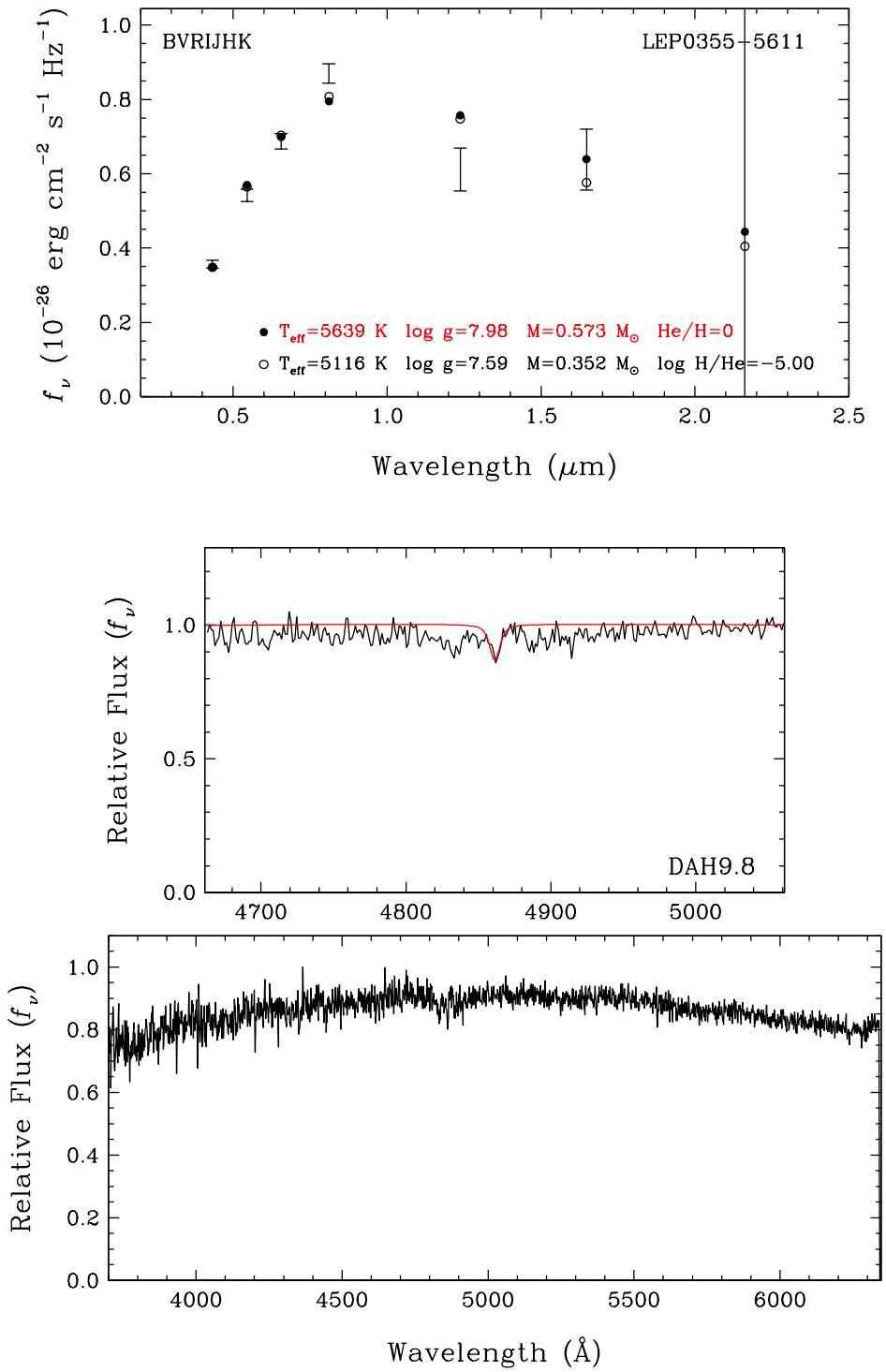

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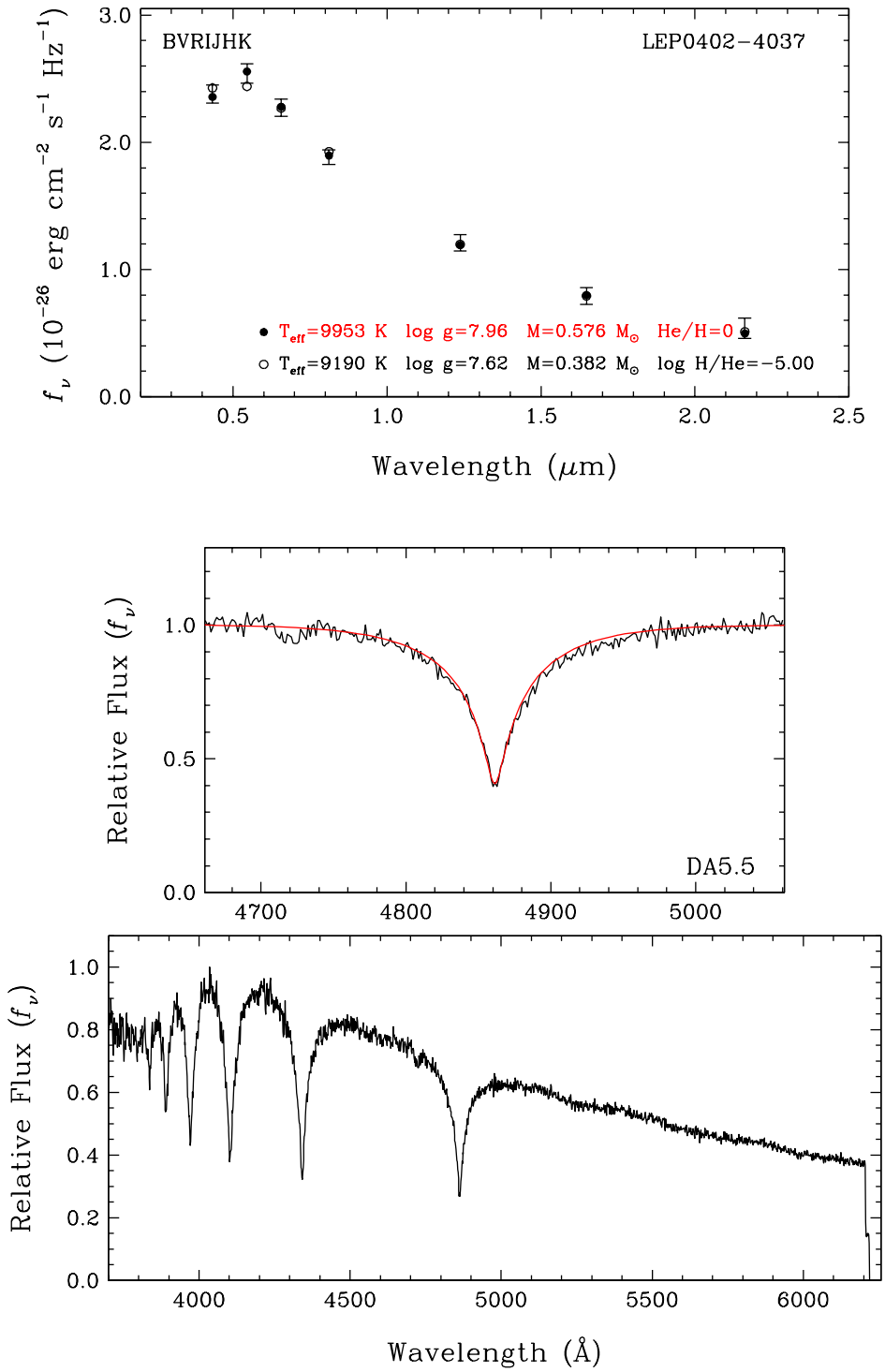

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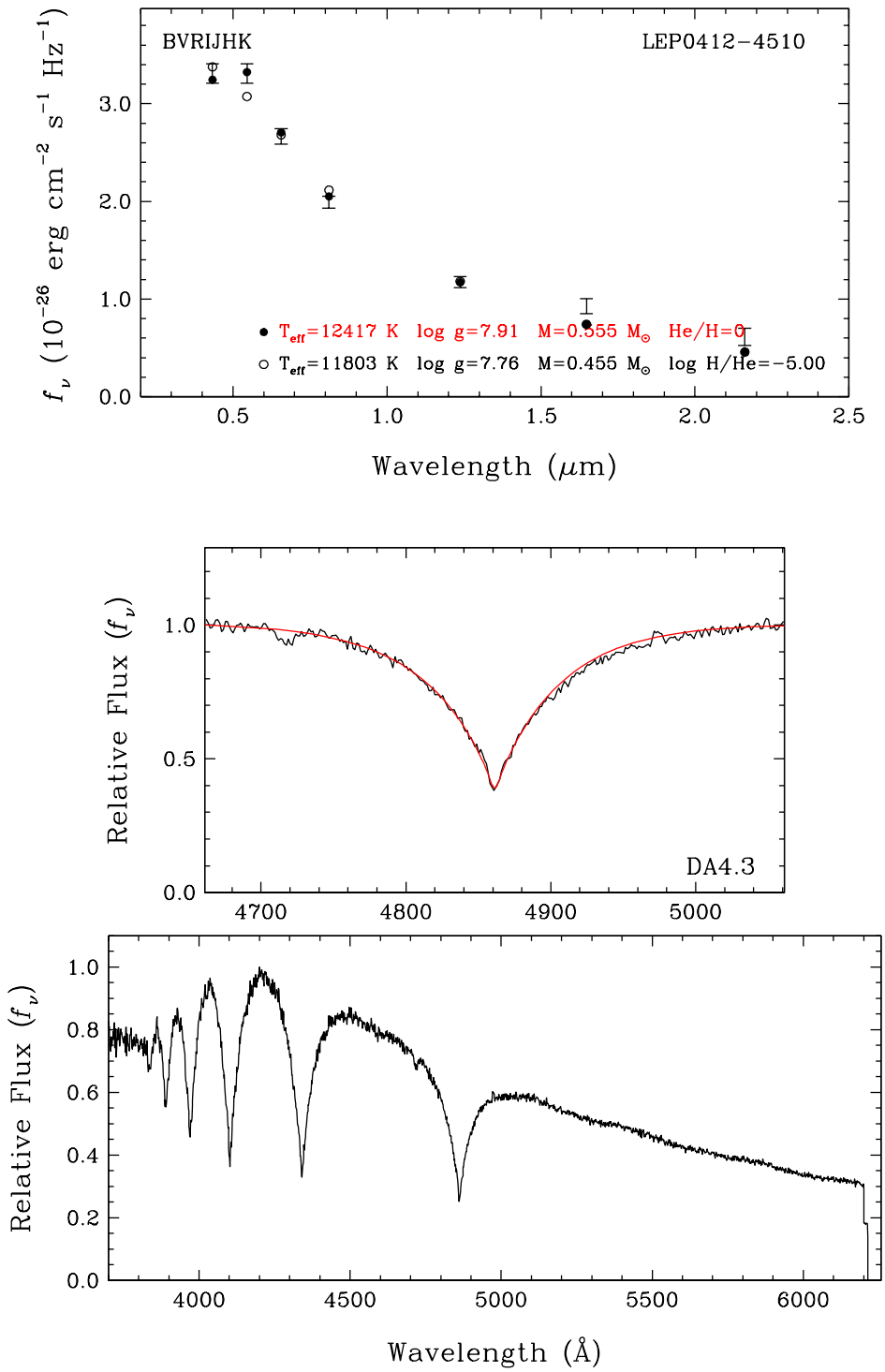

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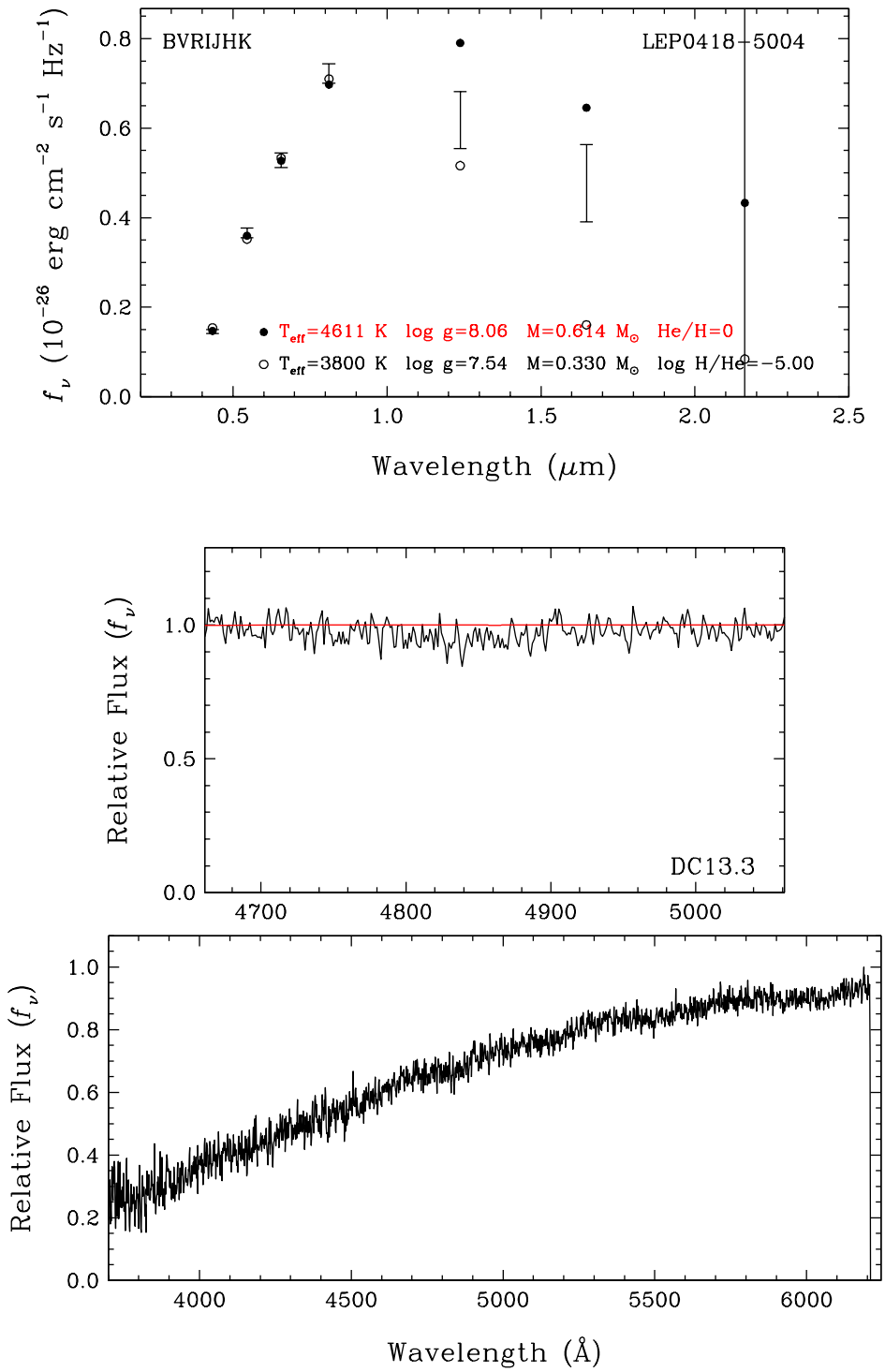

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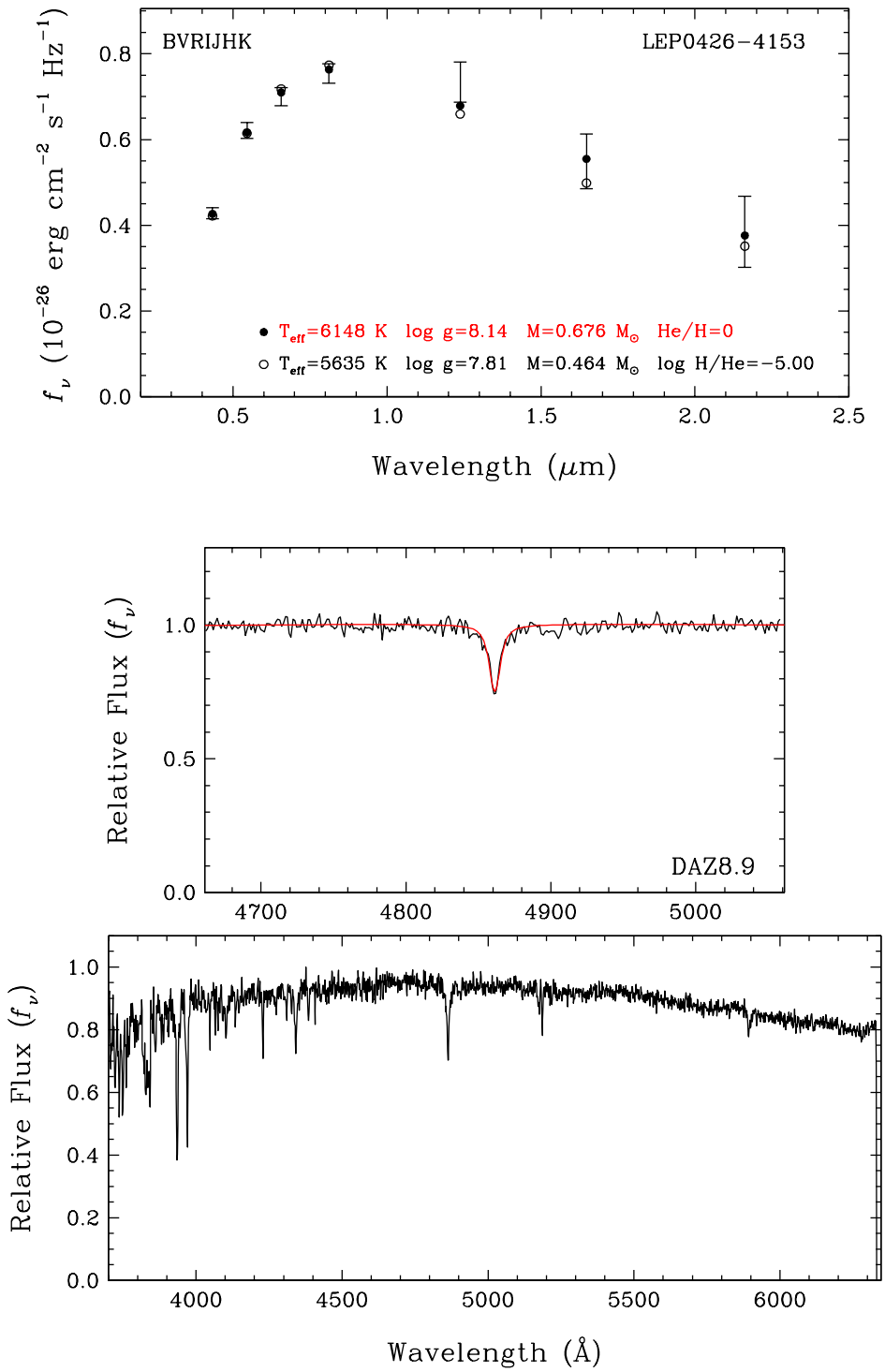

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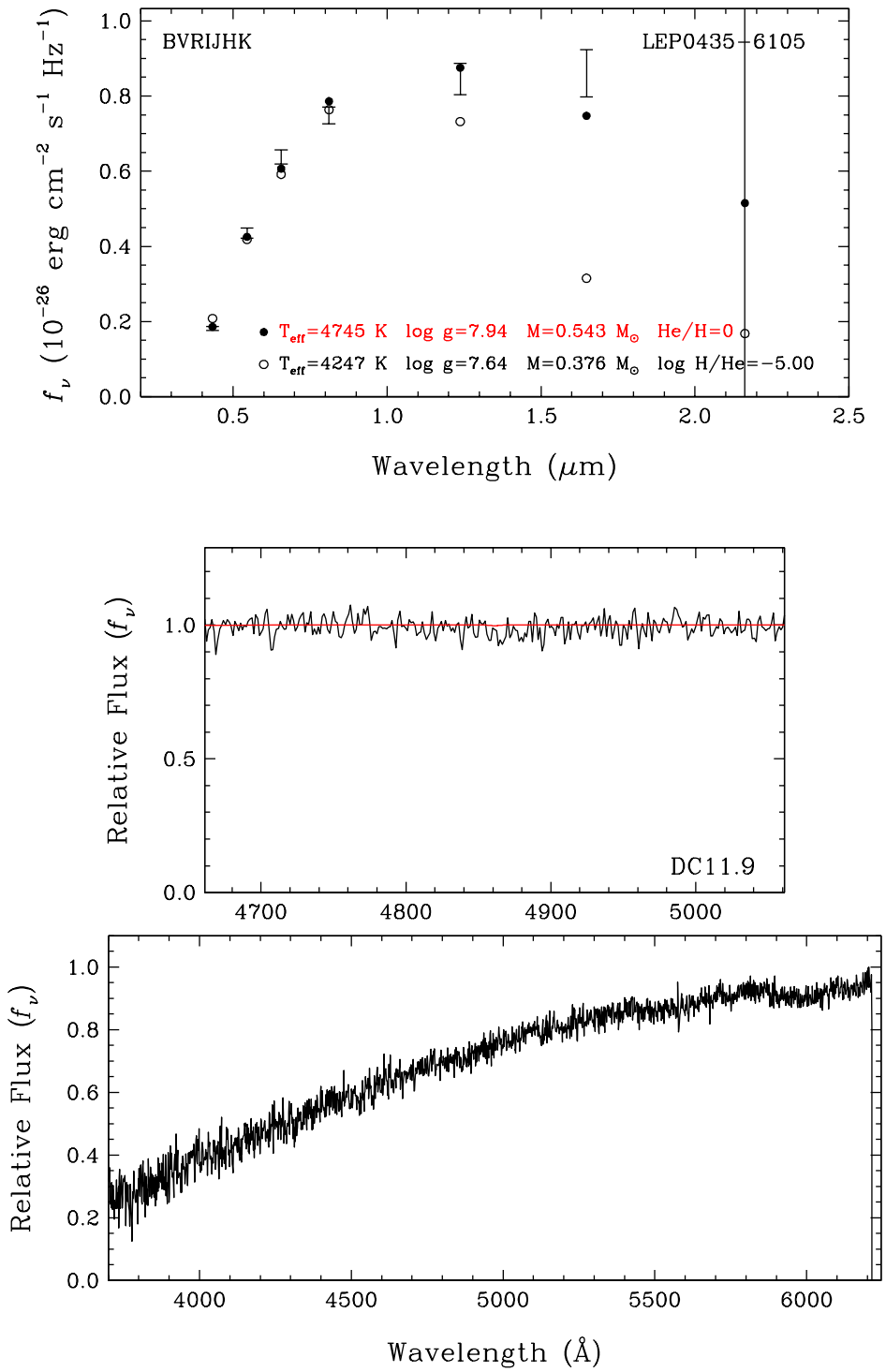
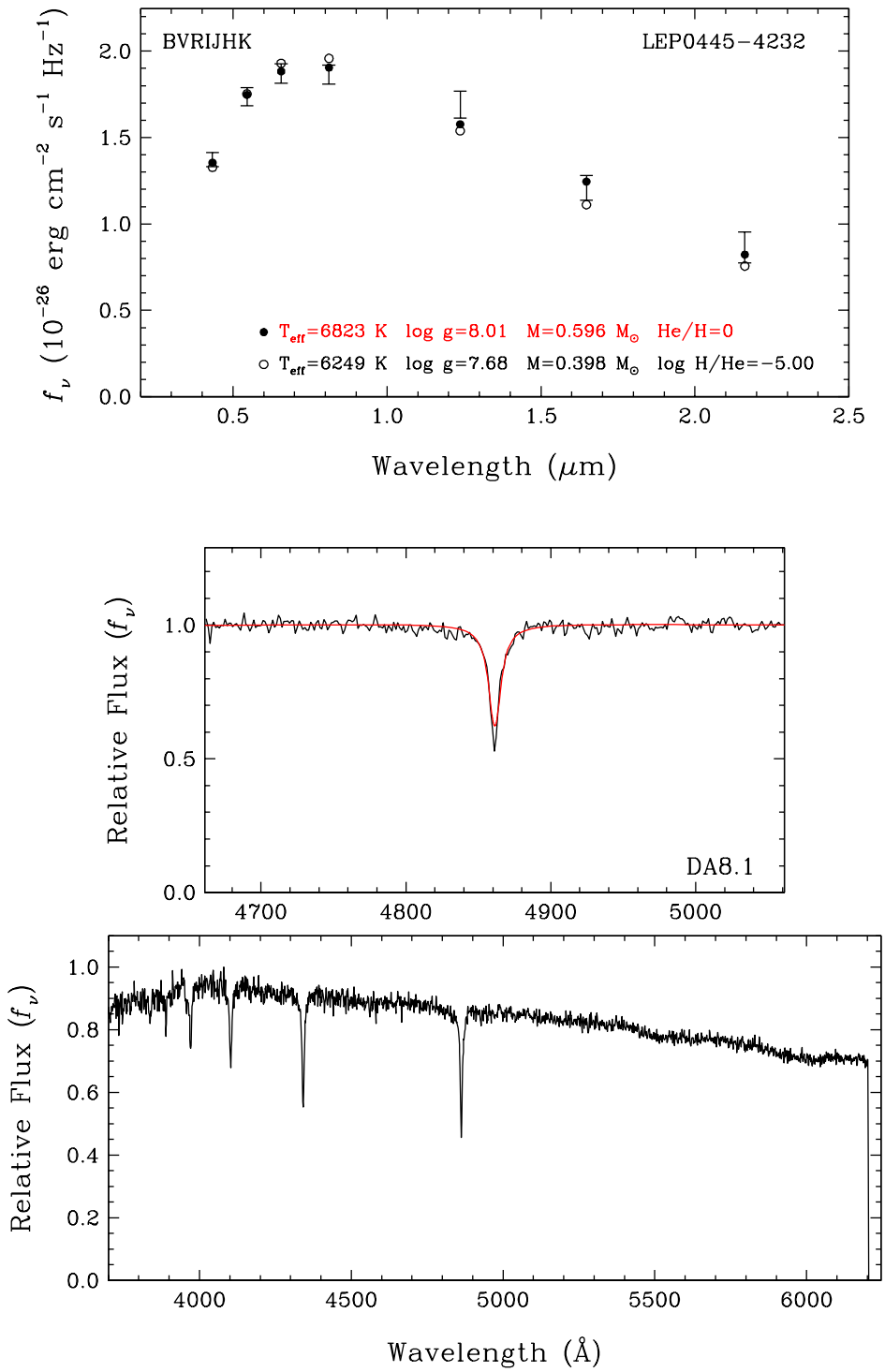


Fig. 26.— Same as Figure 2.



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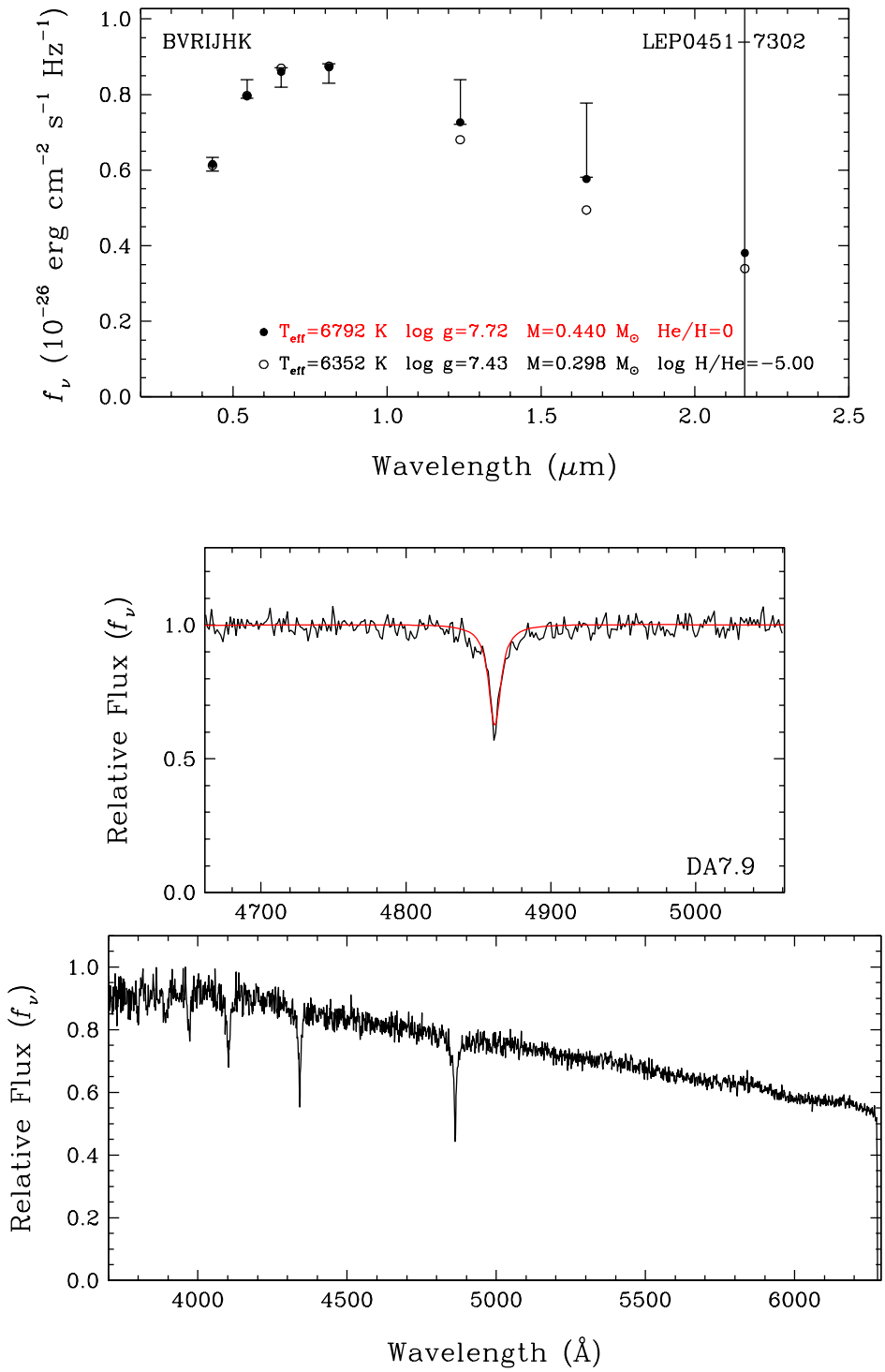

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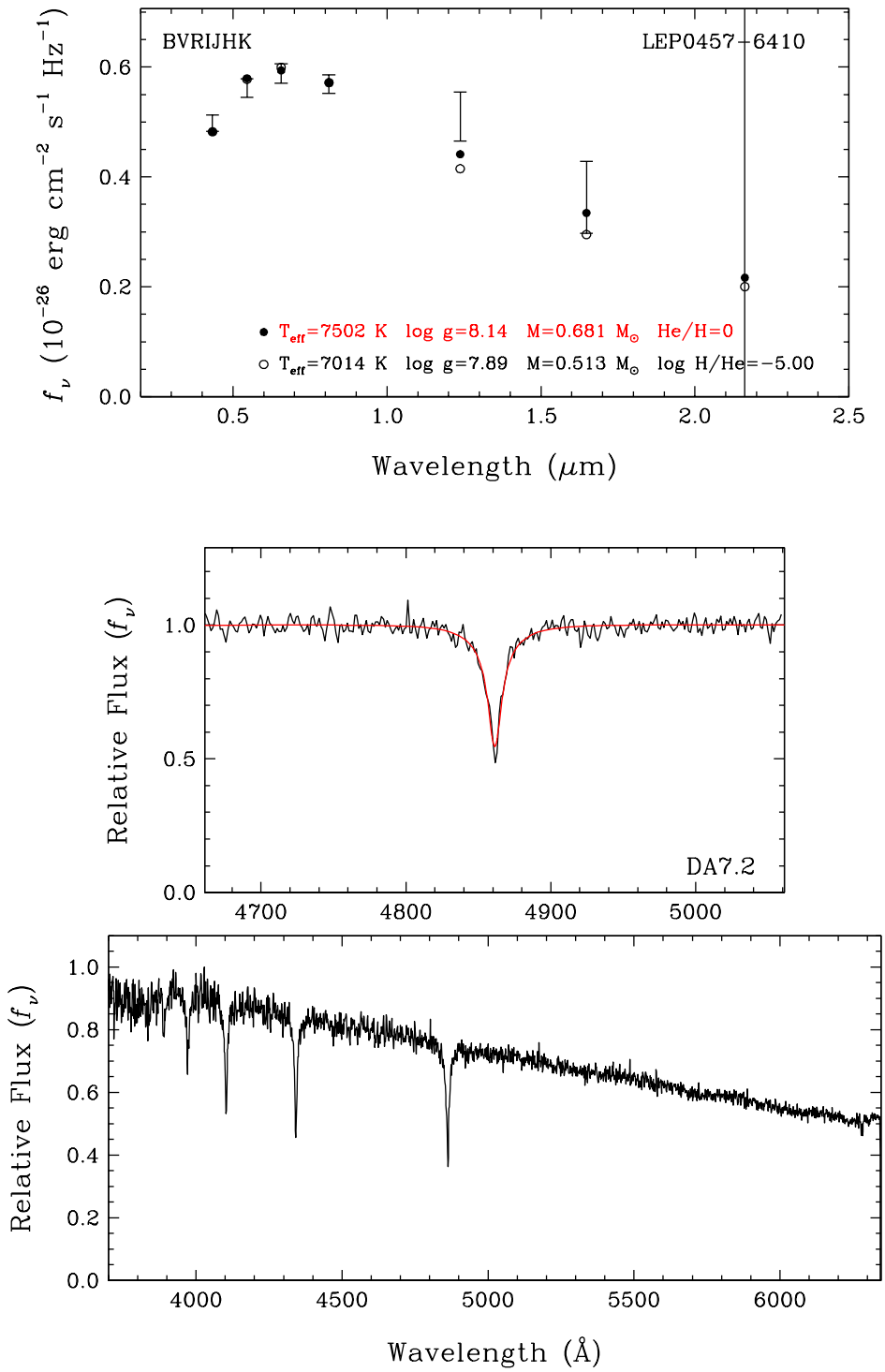

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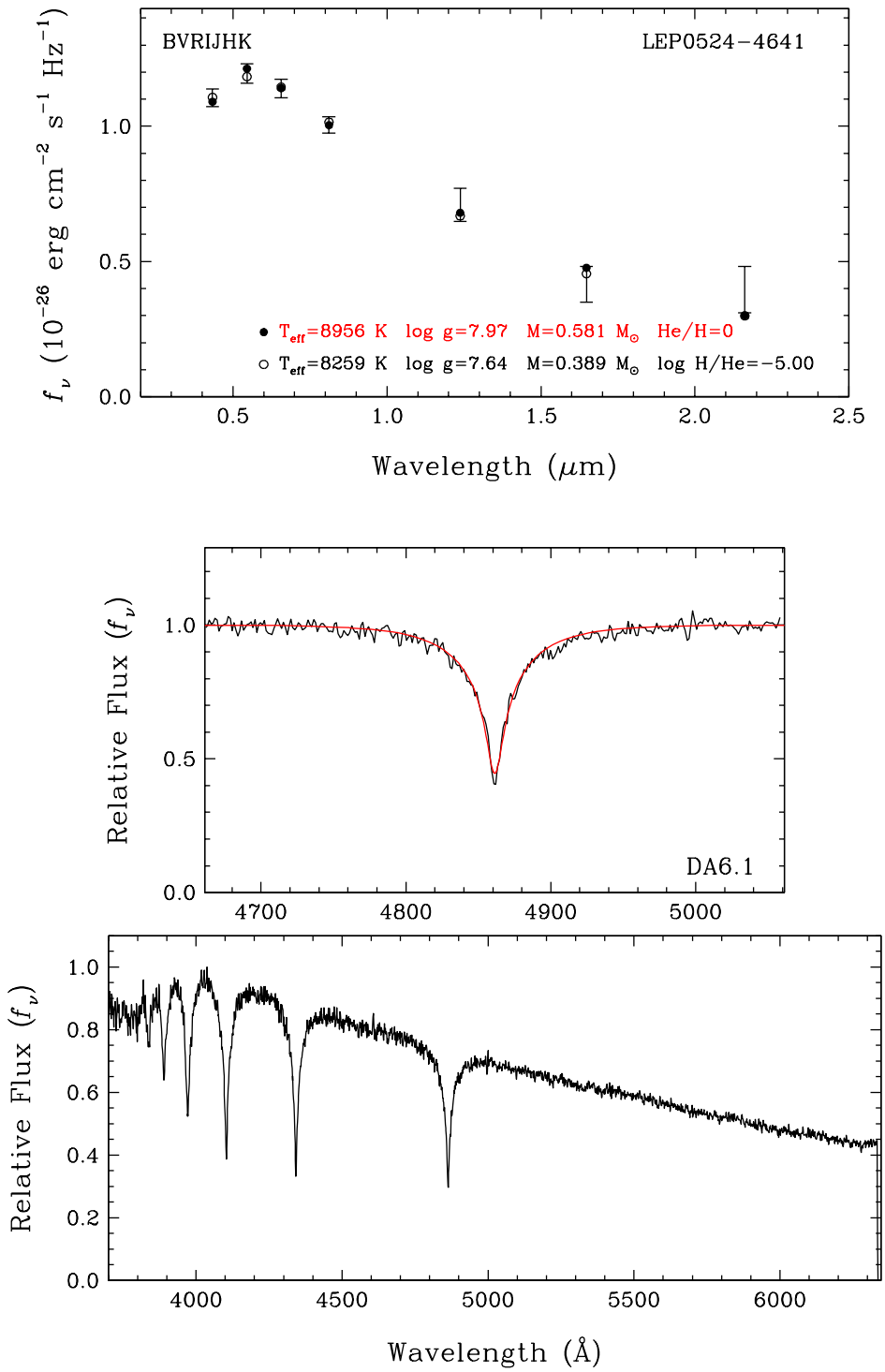
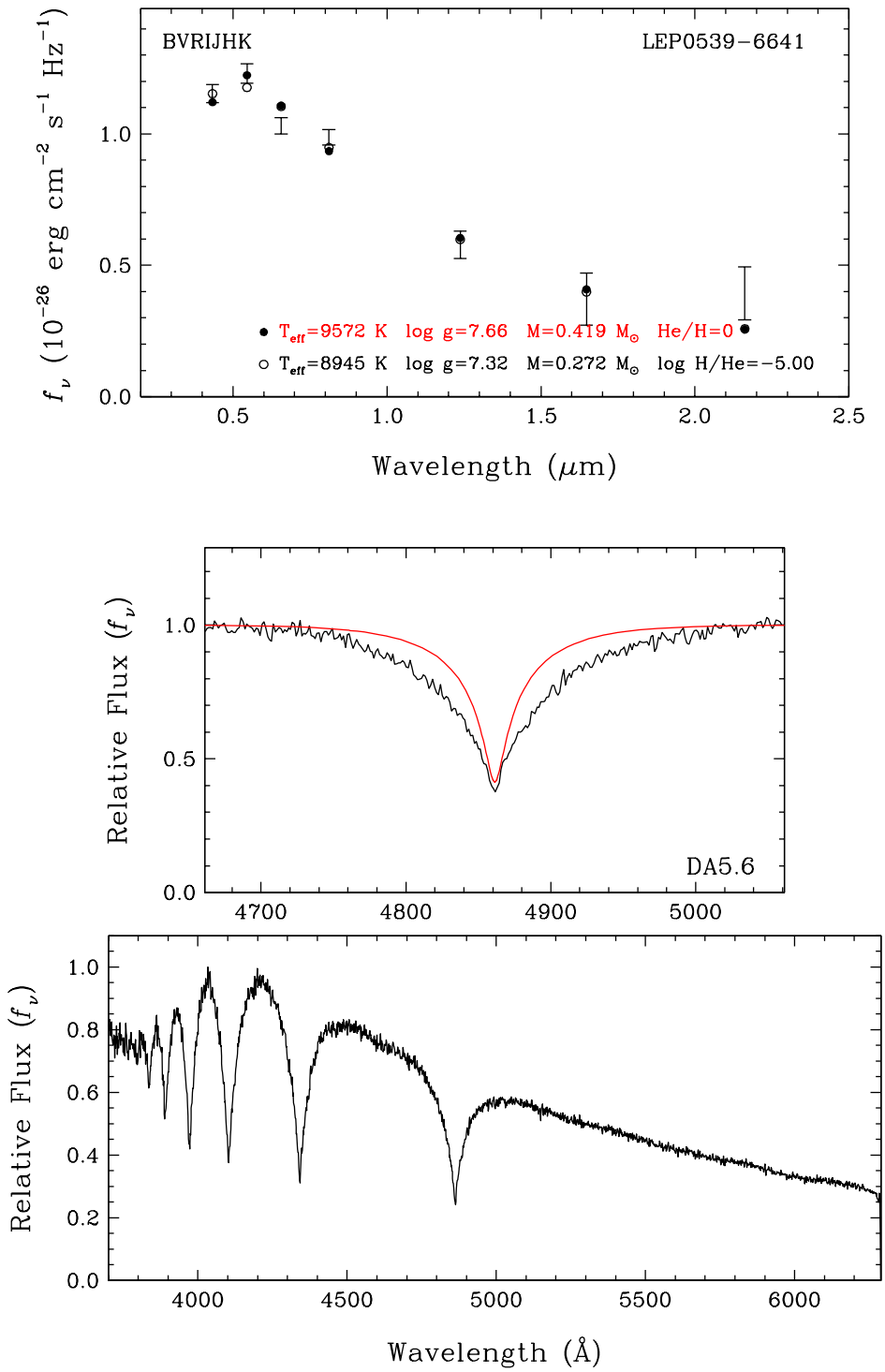


Fig. 30.— Same as Figure 2.



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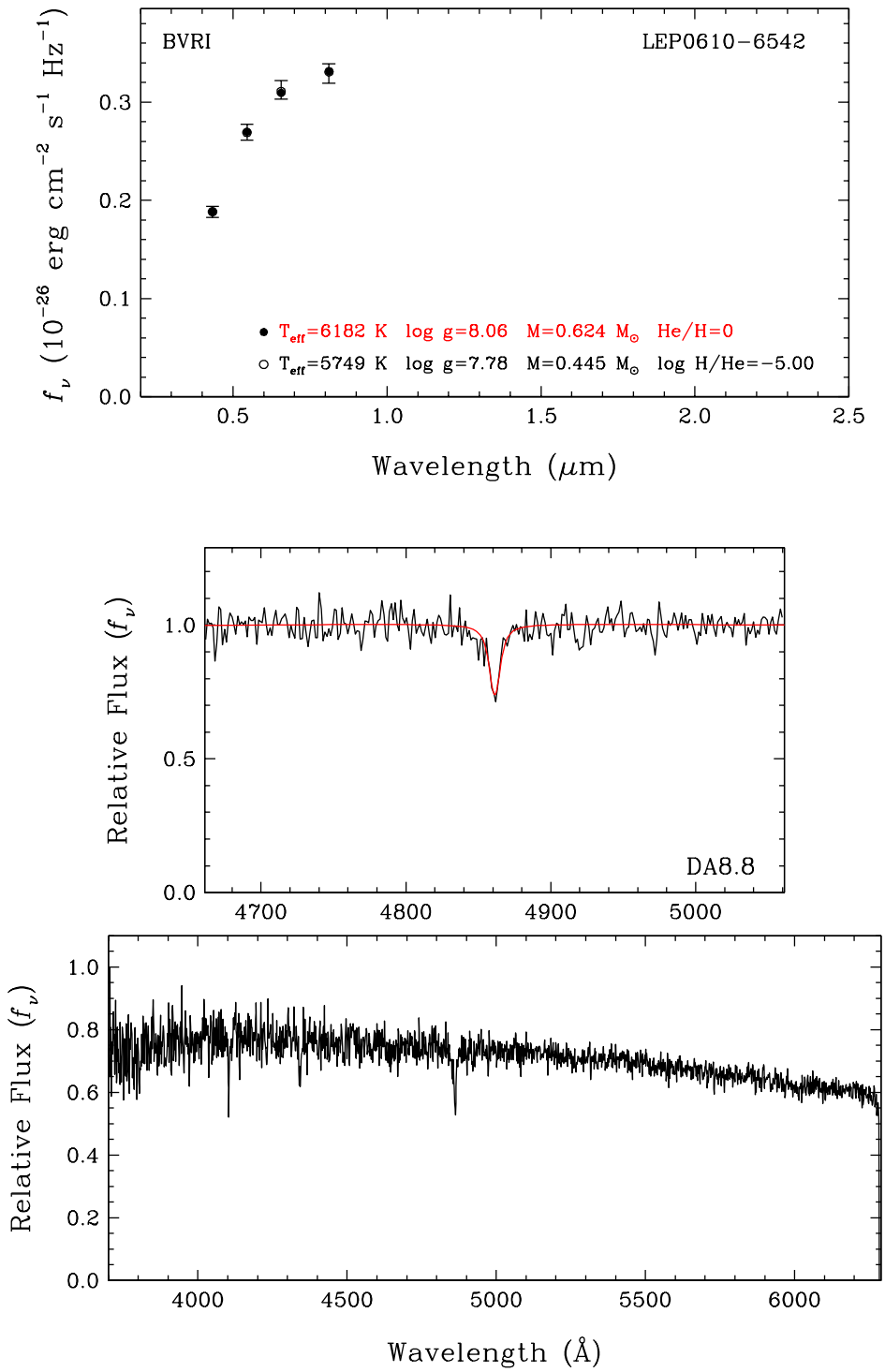

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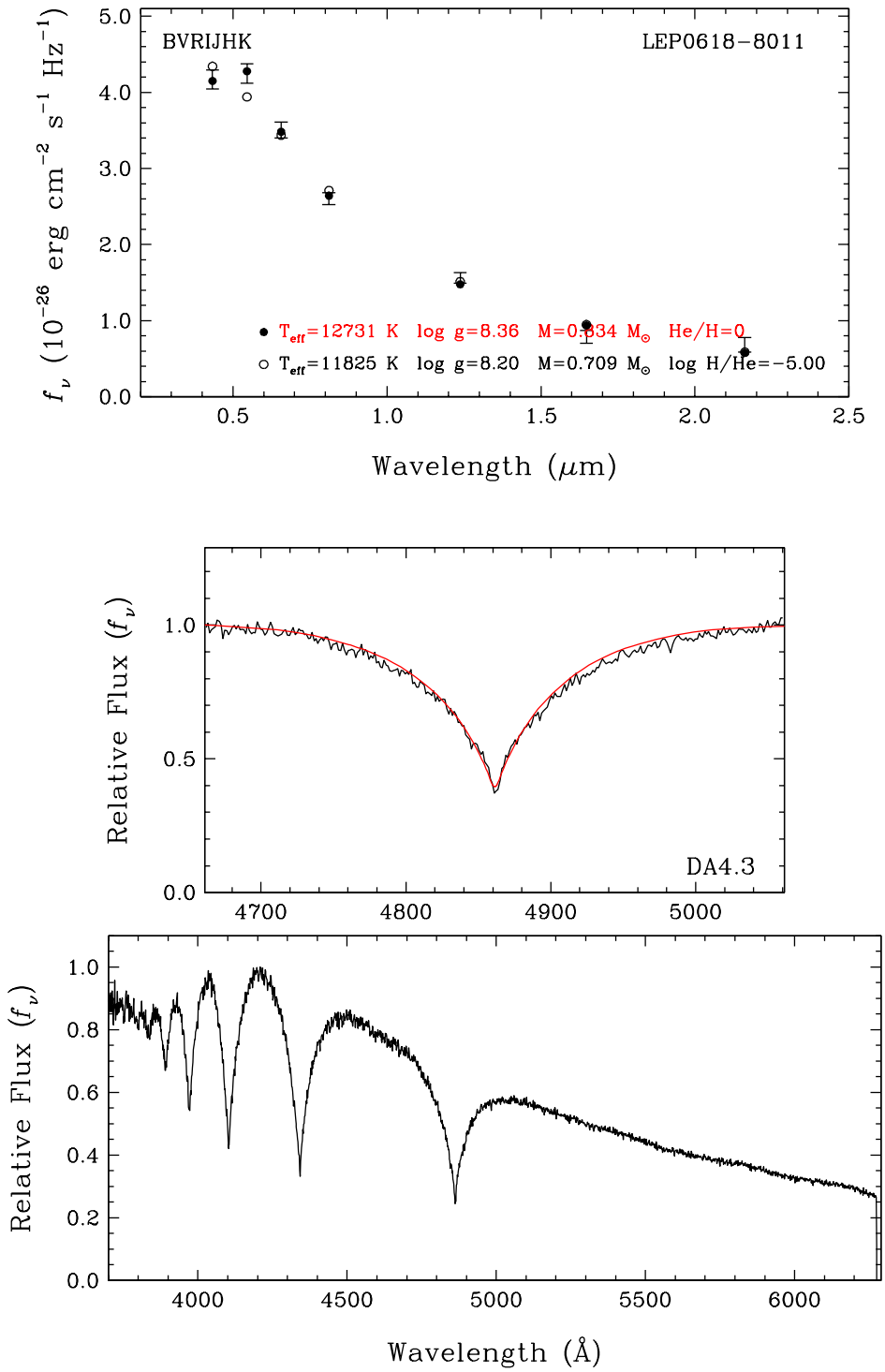

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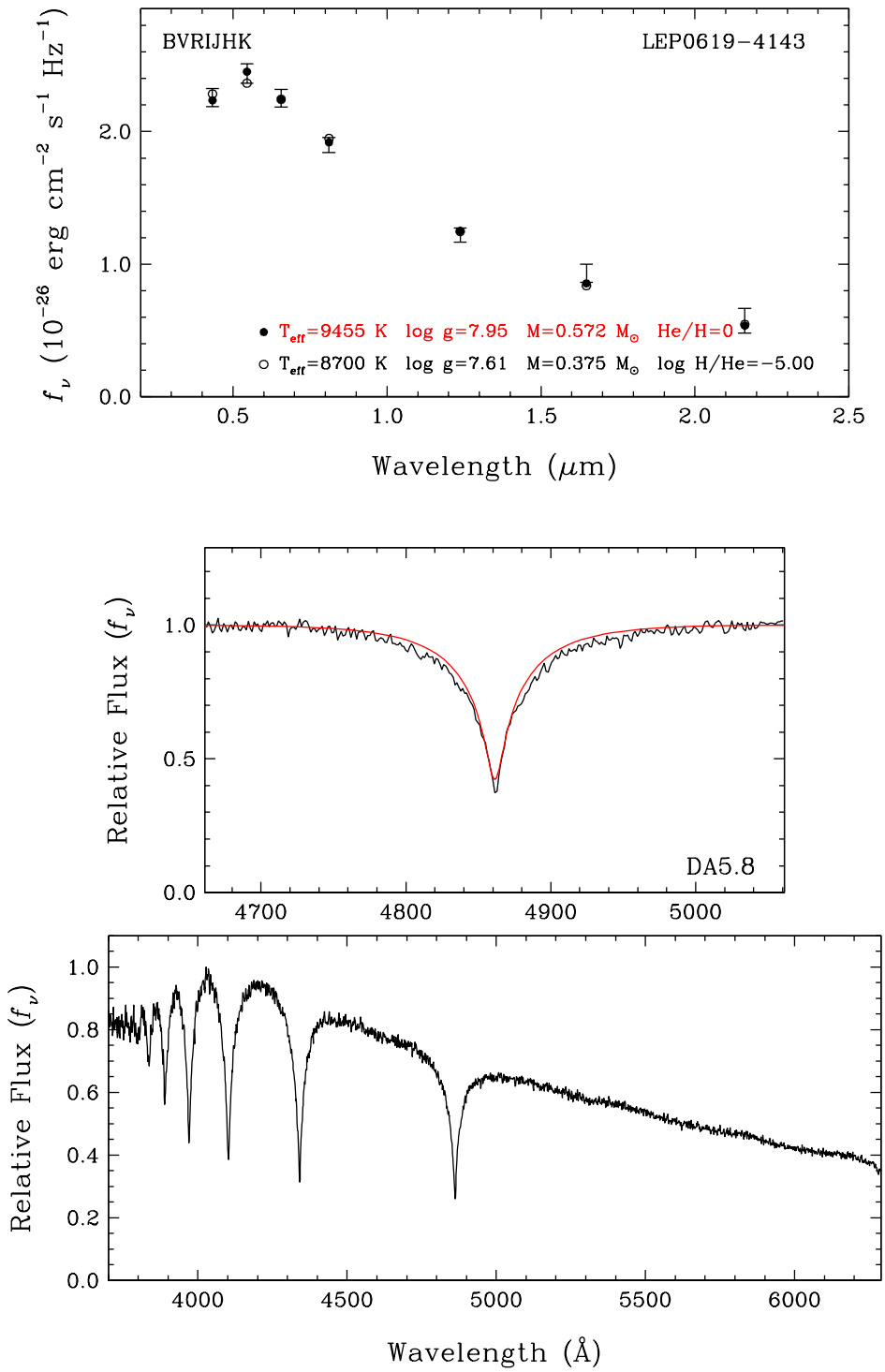

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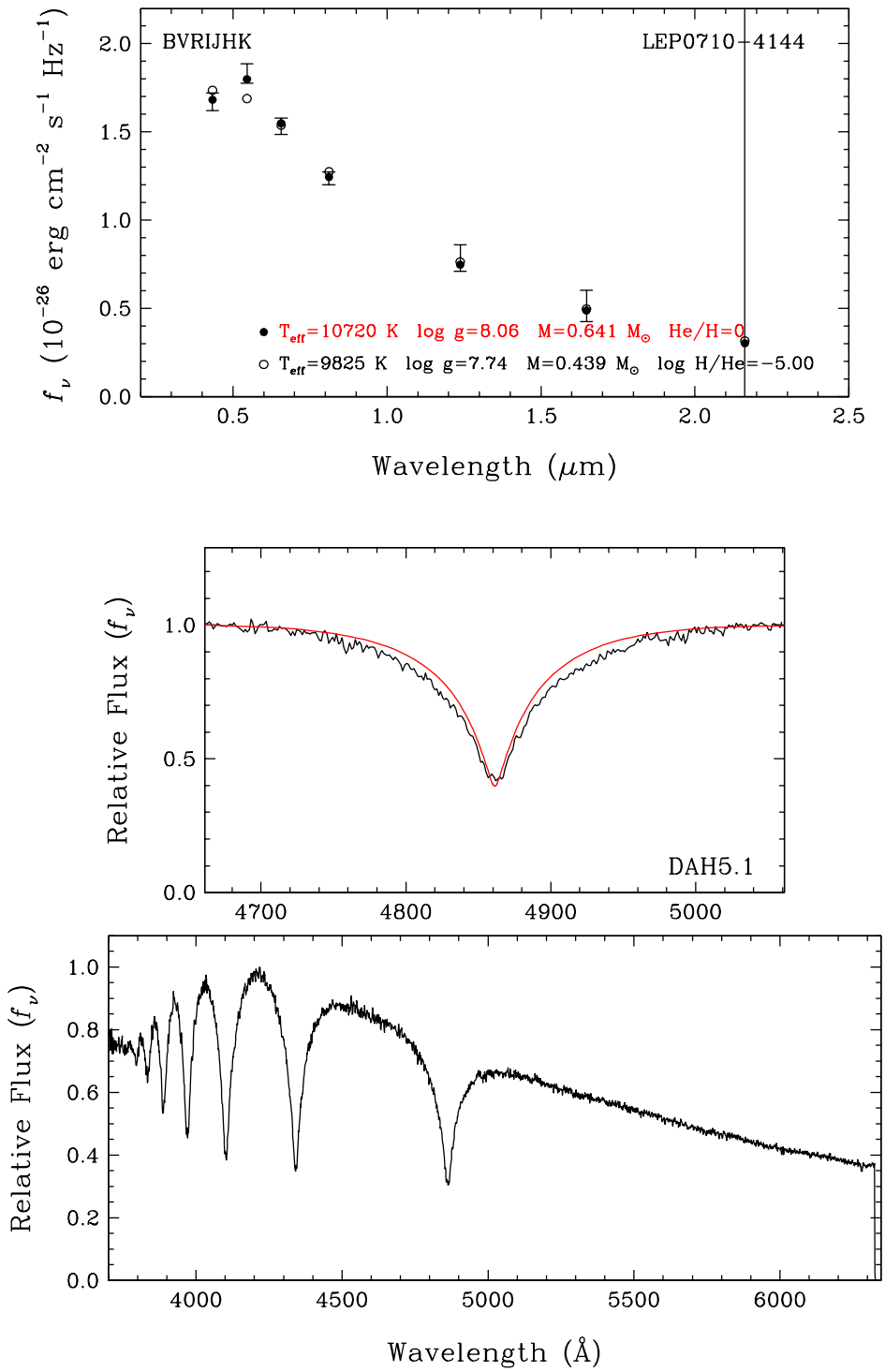

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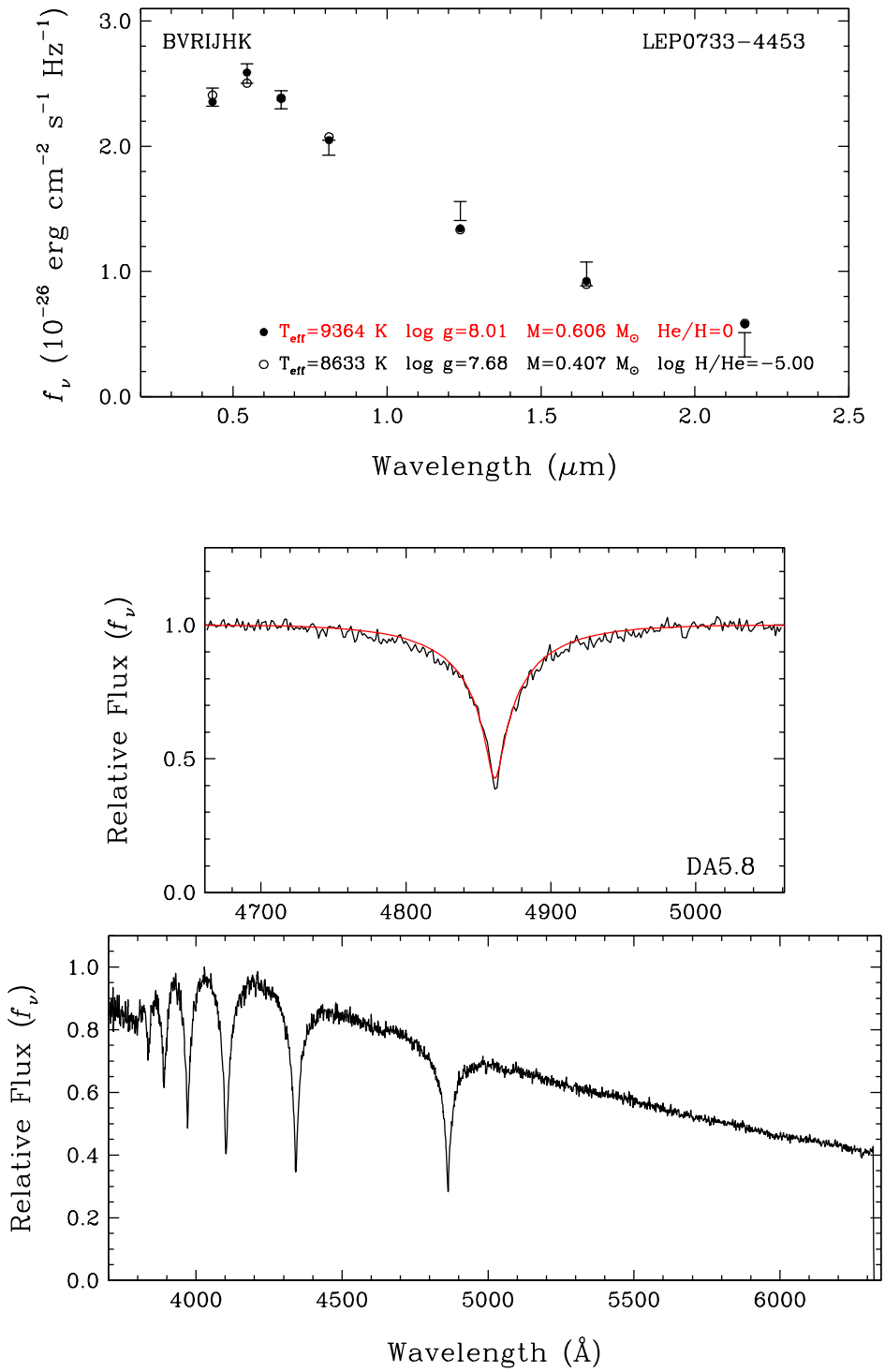

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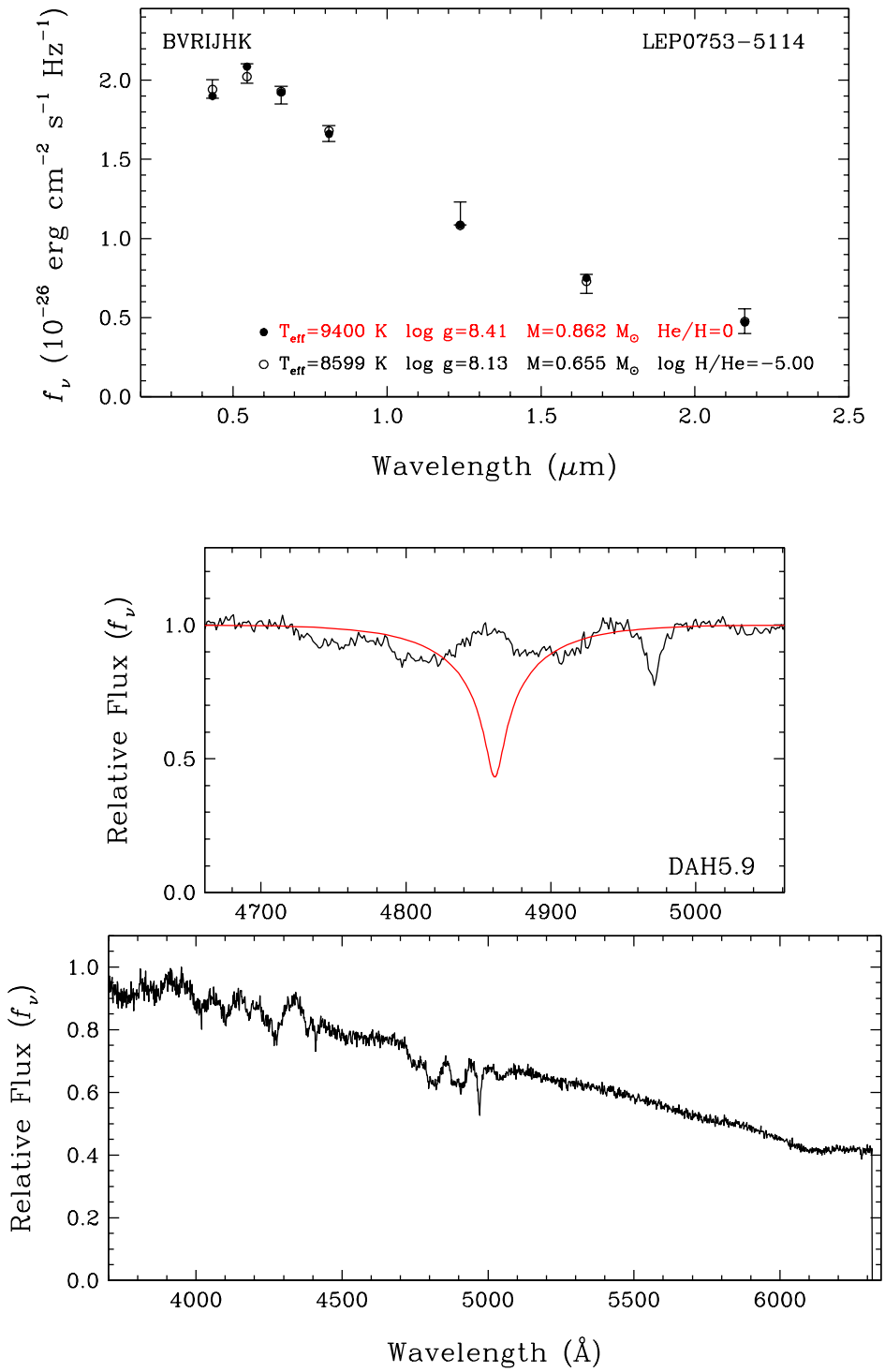

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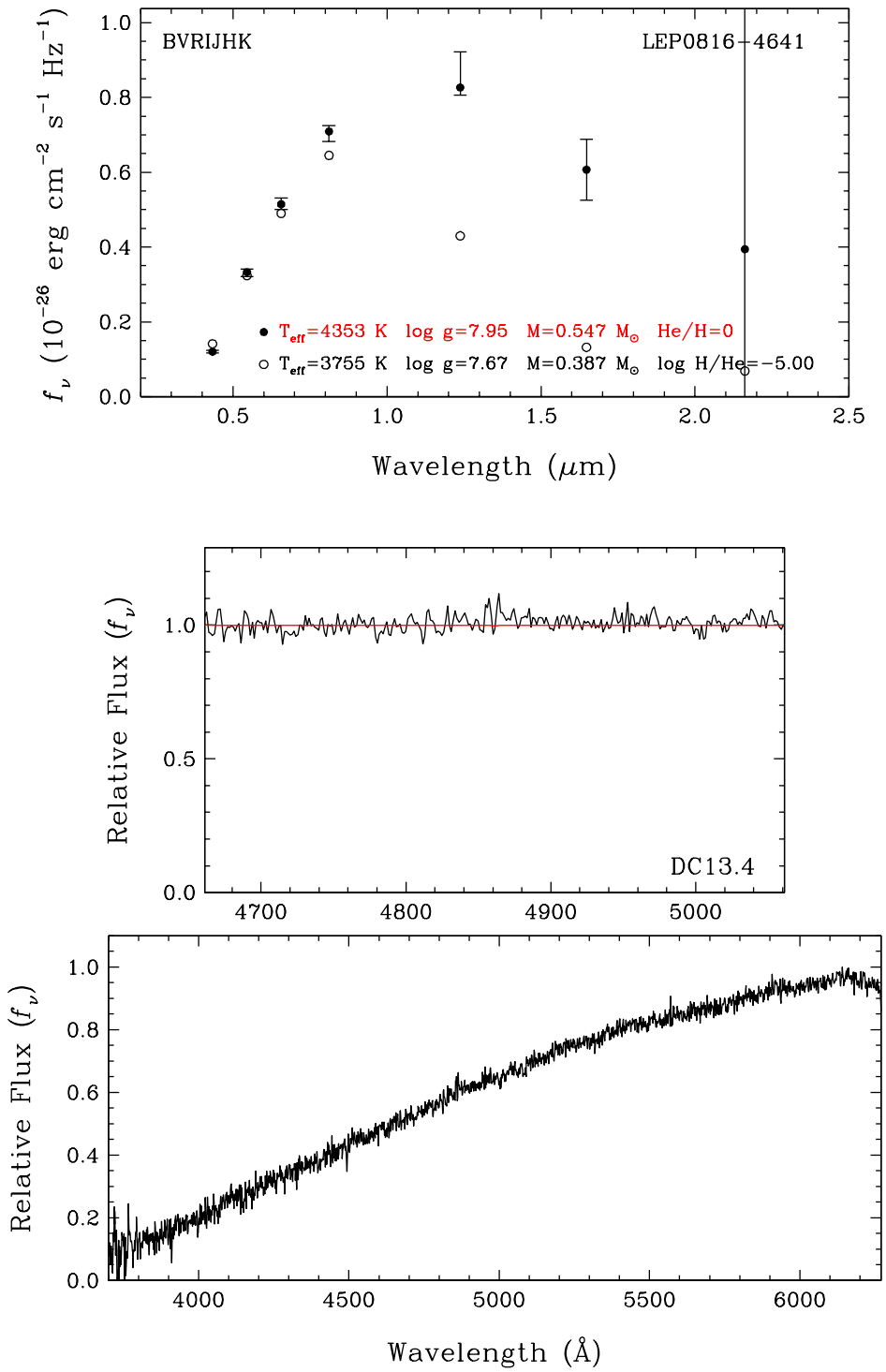

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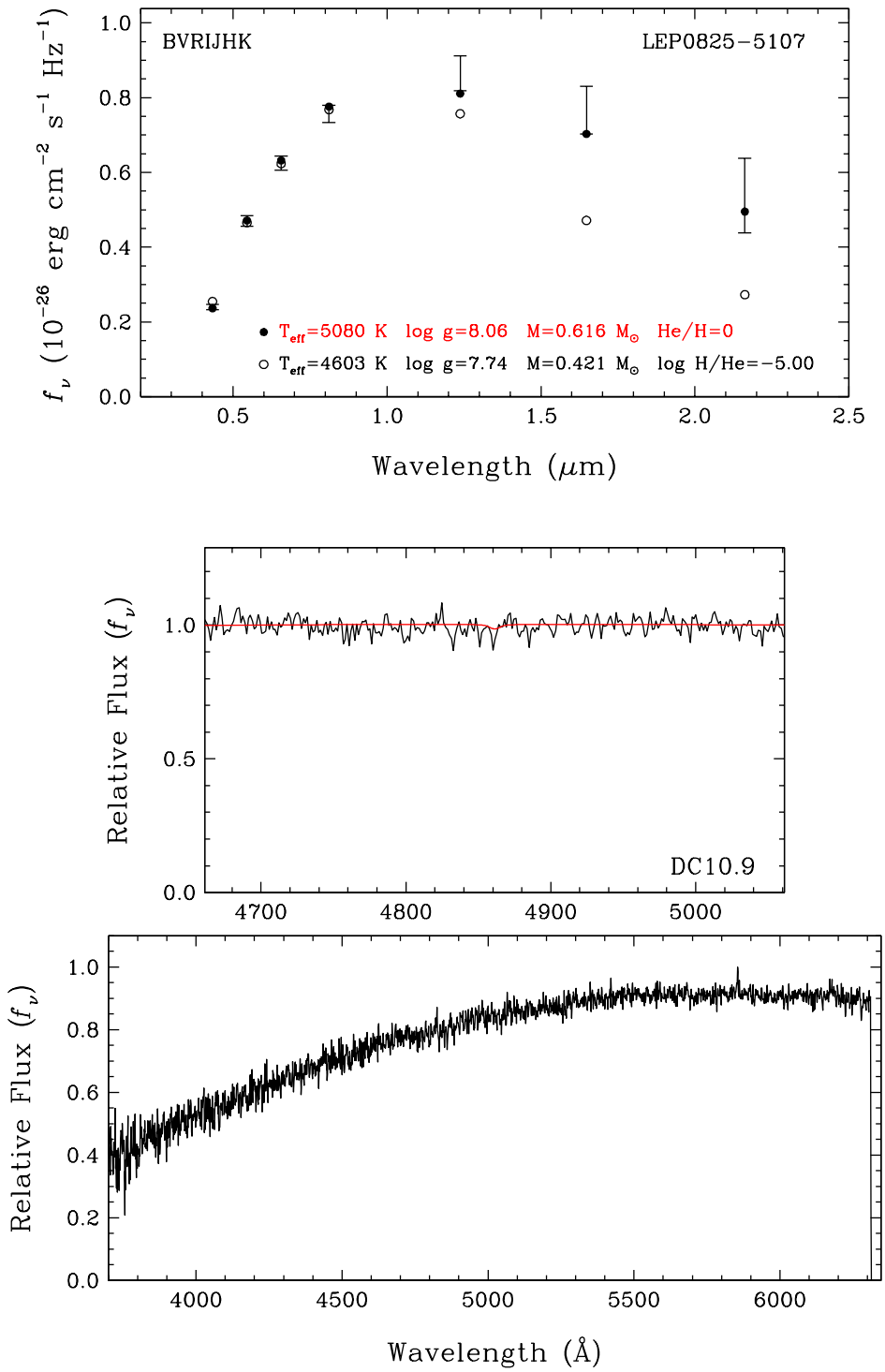

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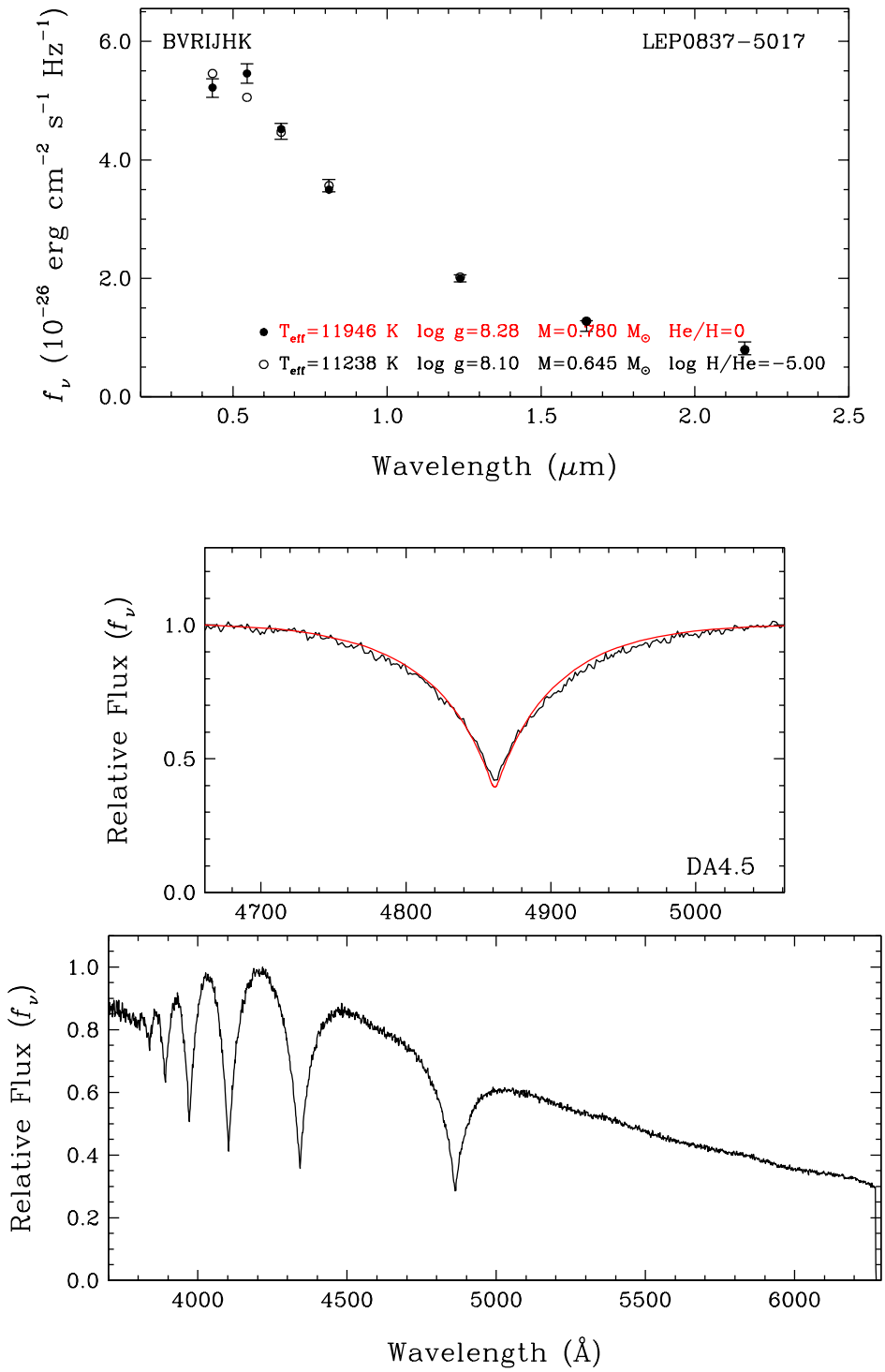

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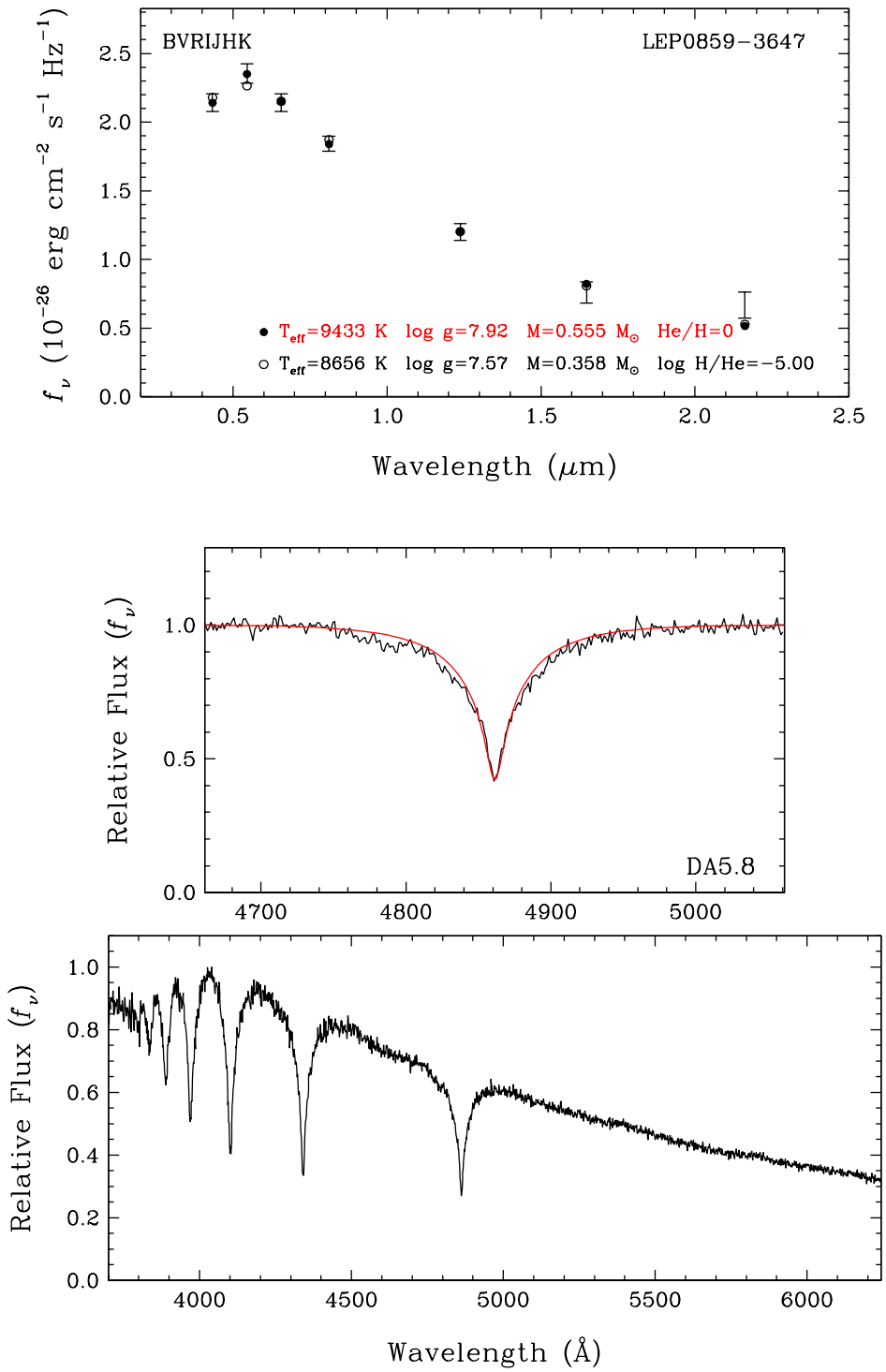

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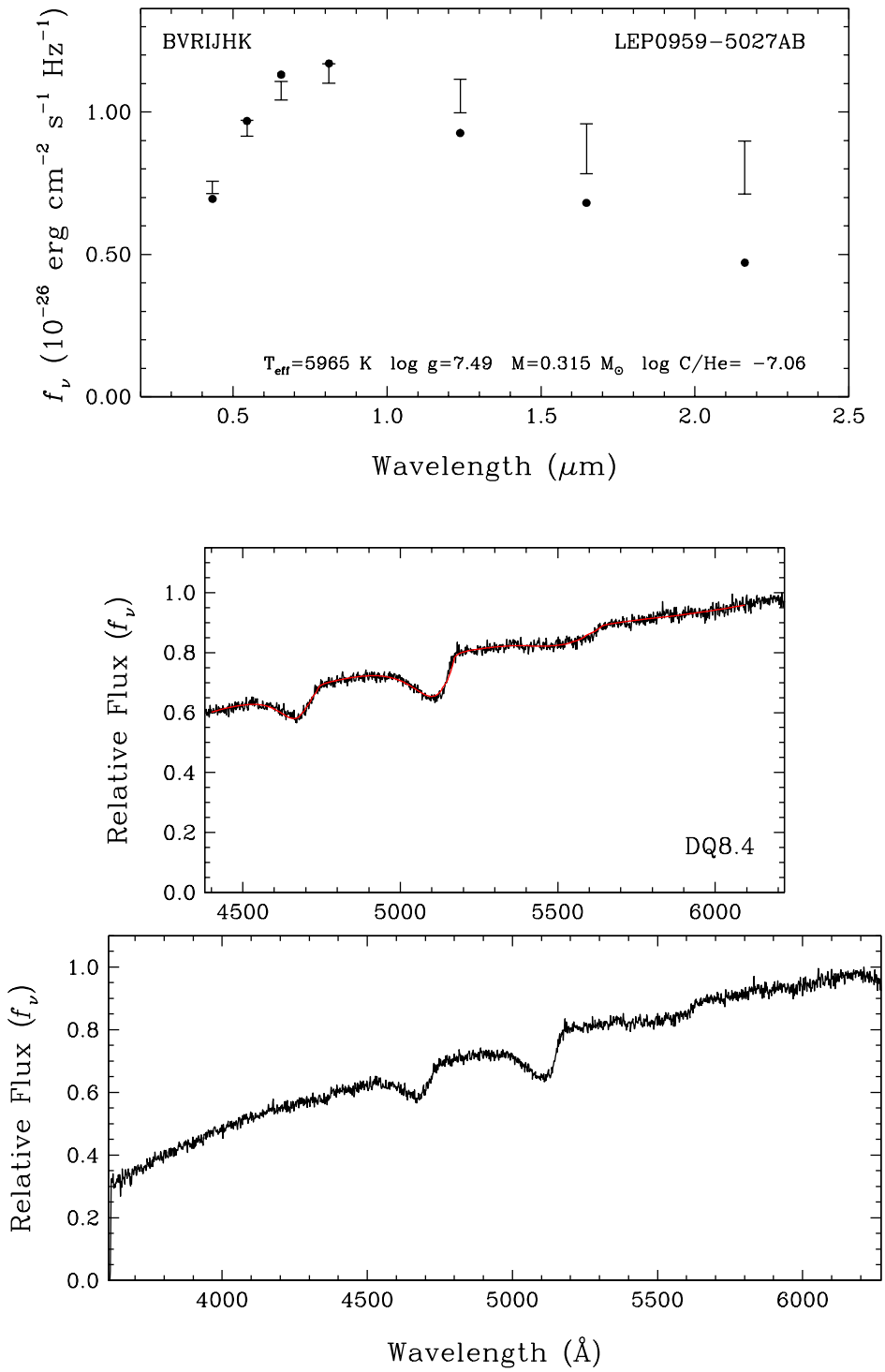

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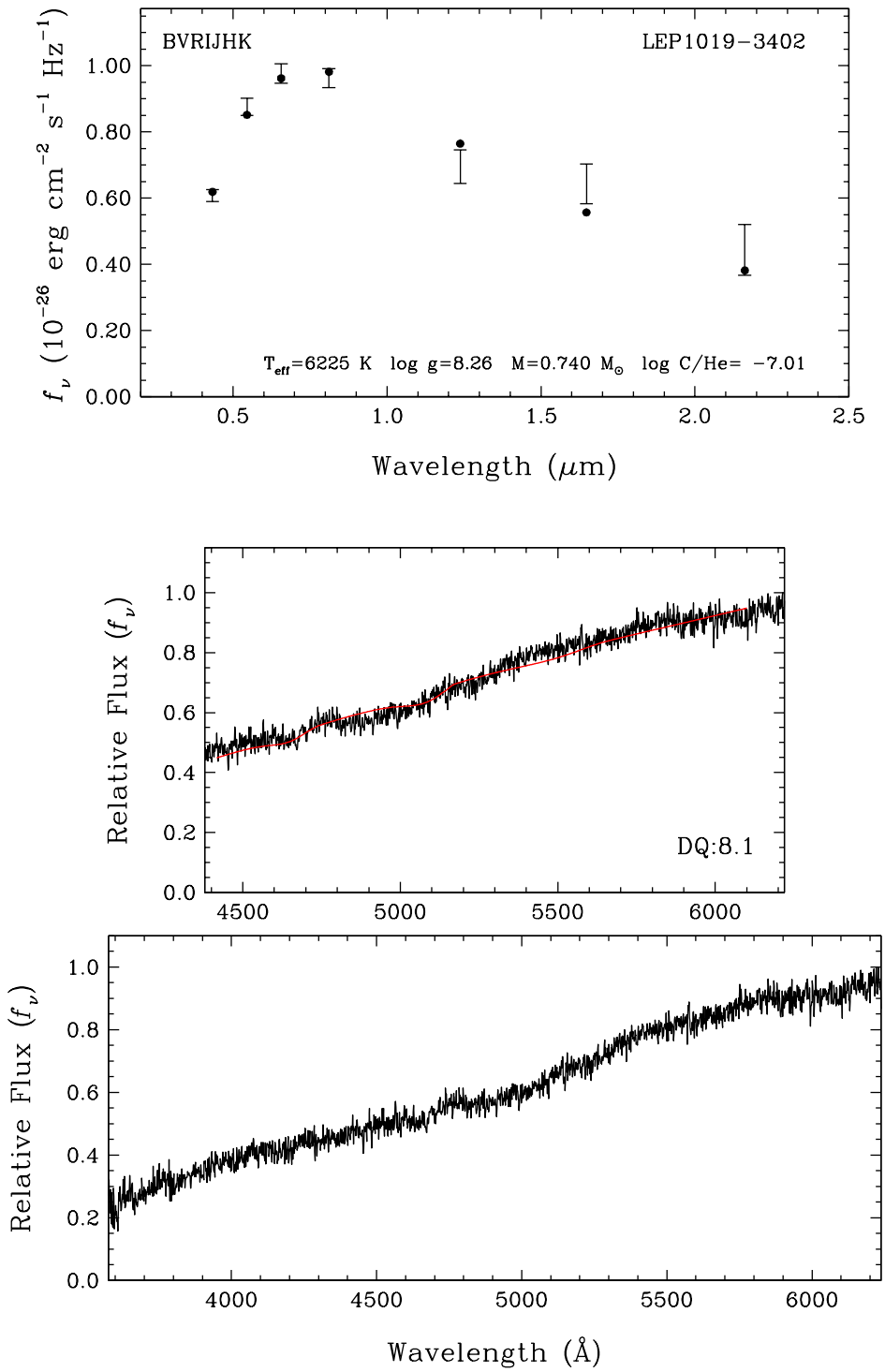

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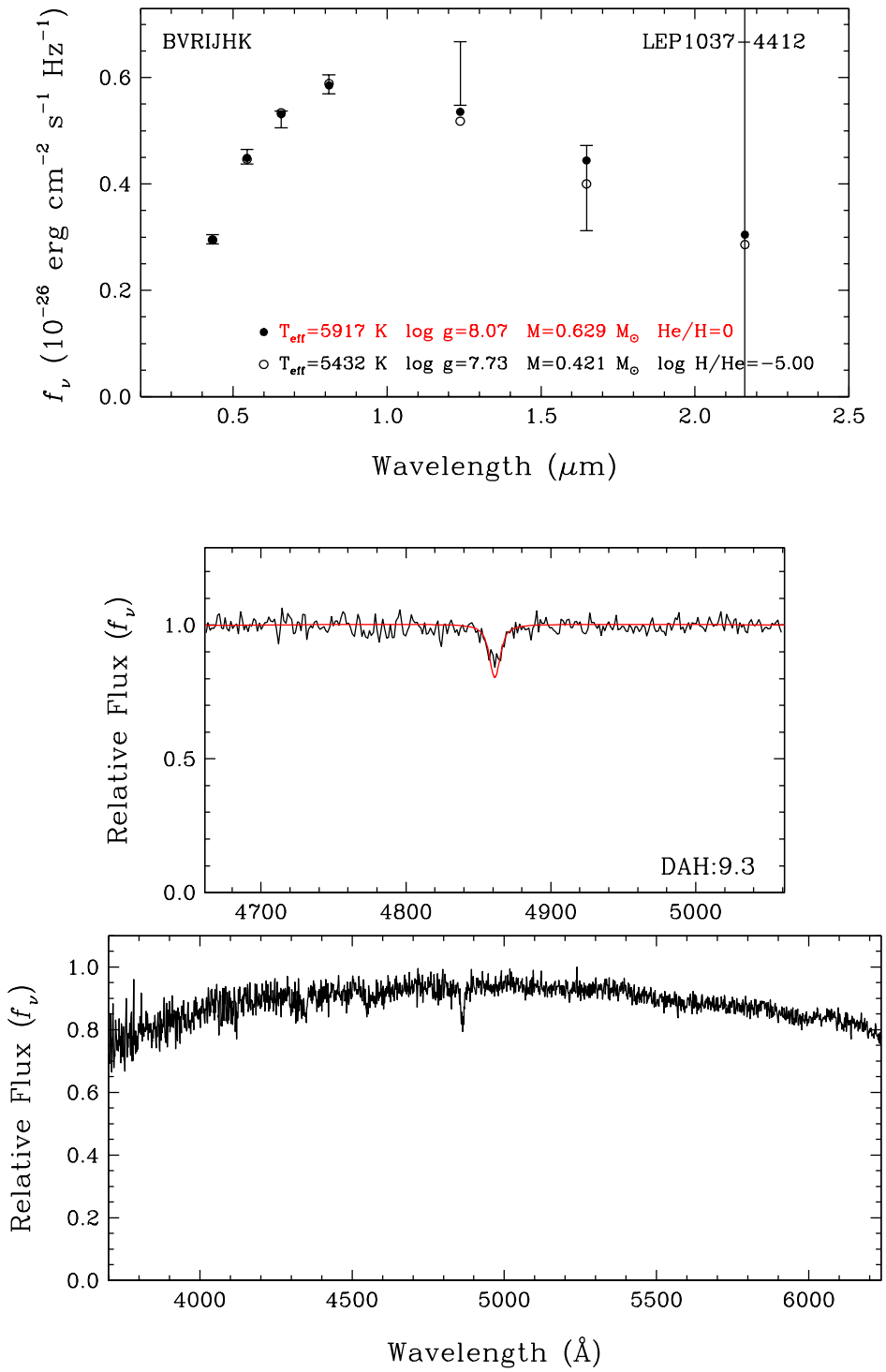

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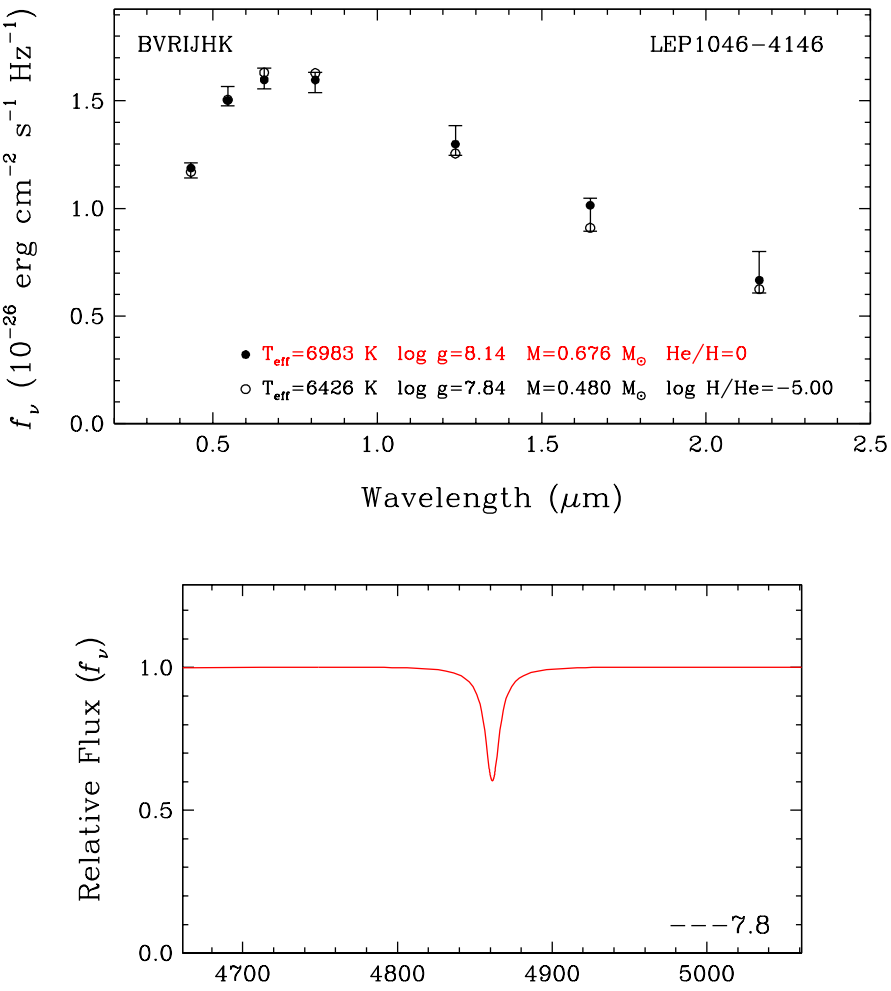

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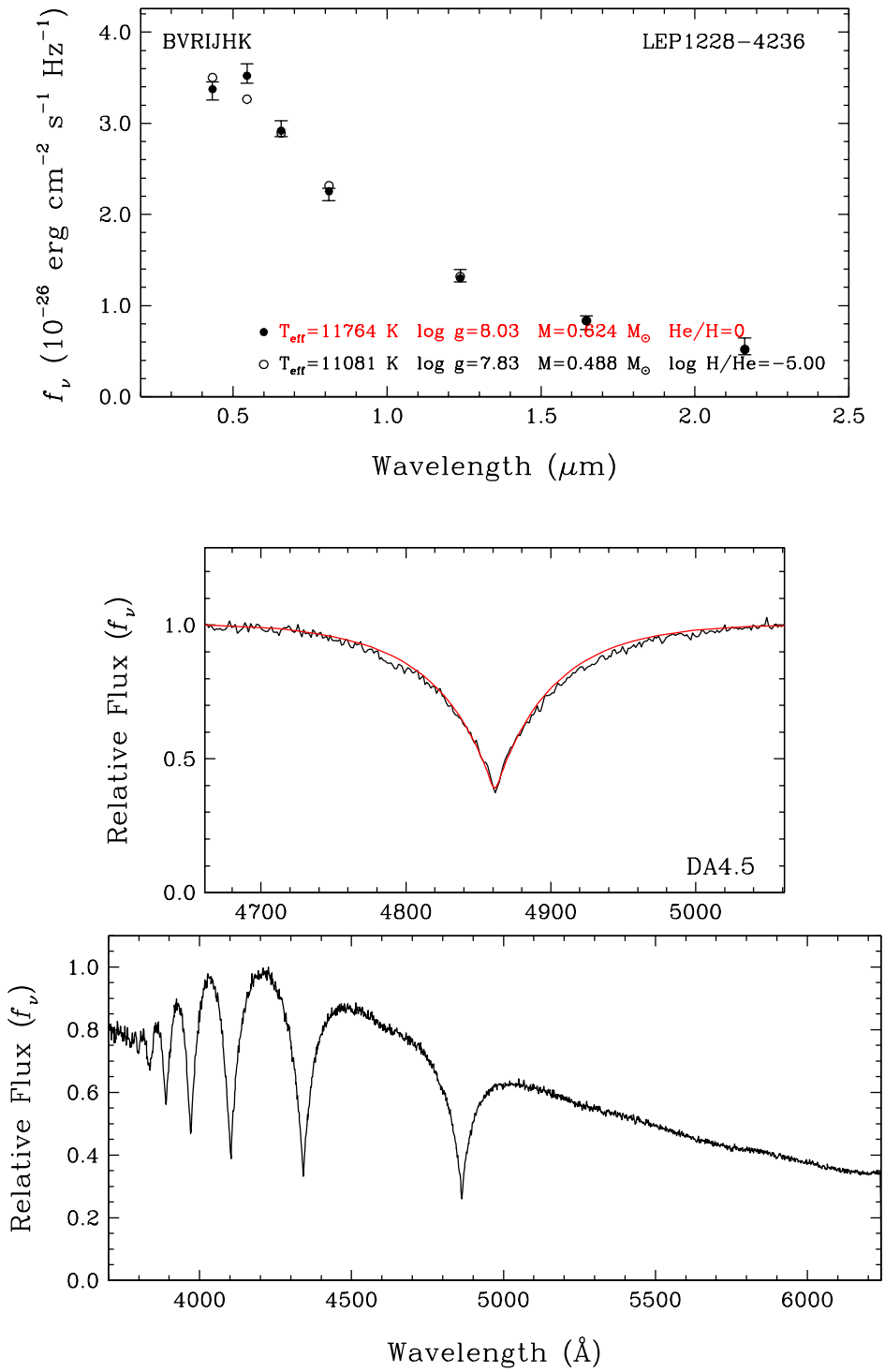

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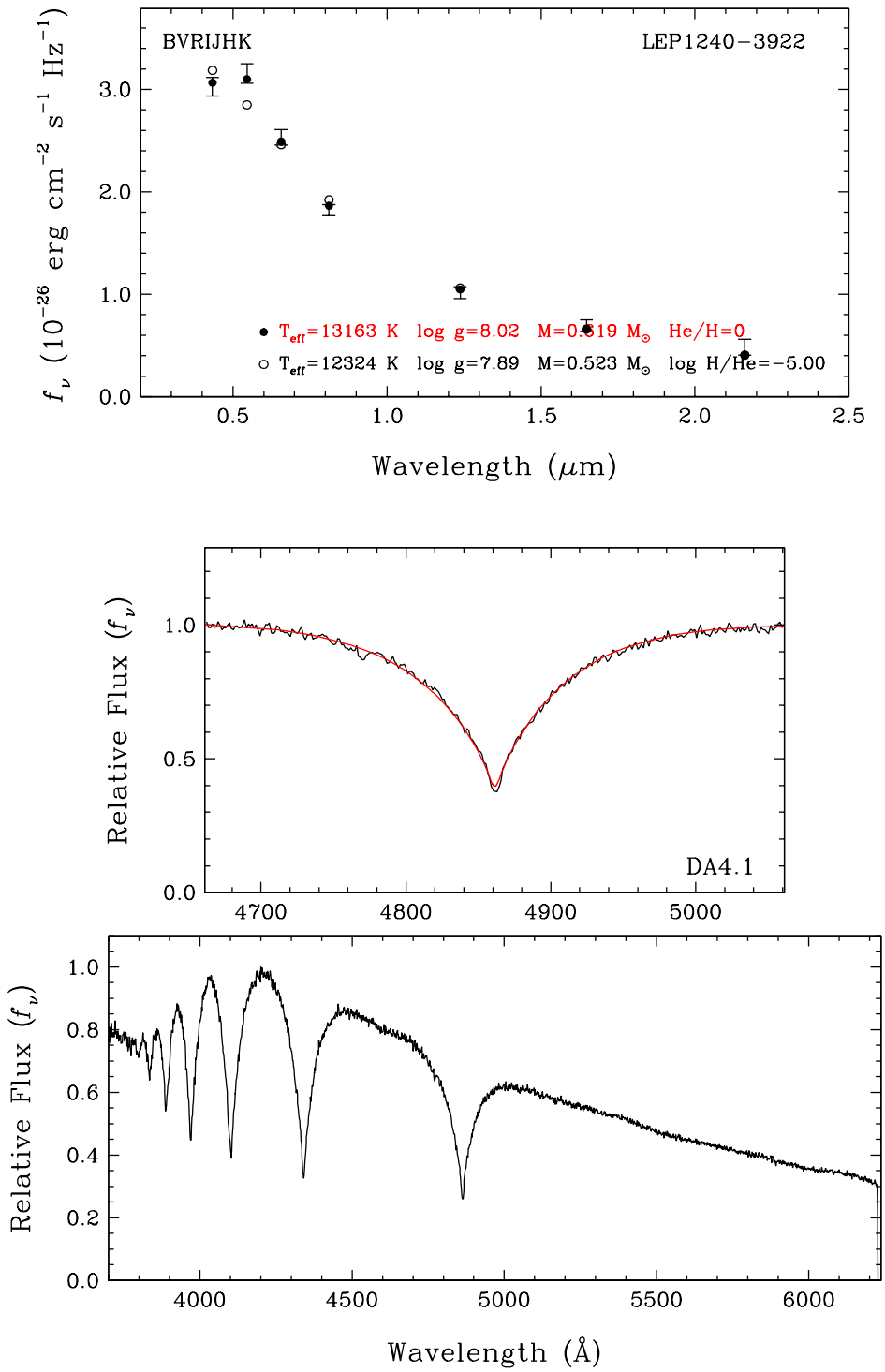

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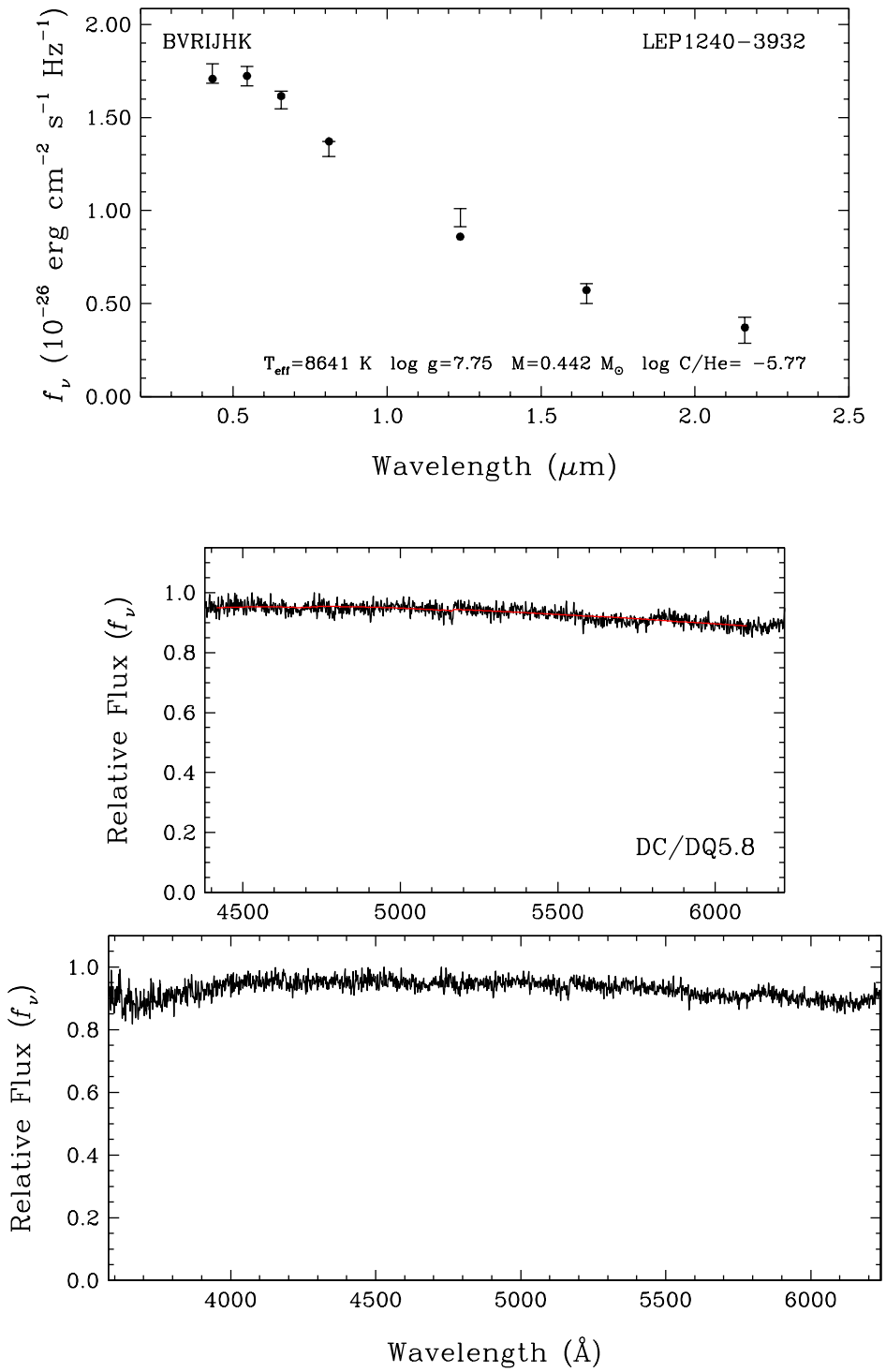

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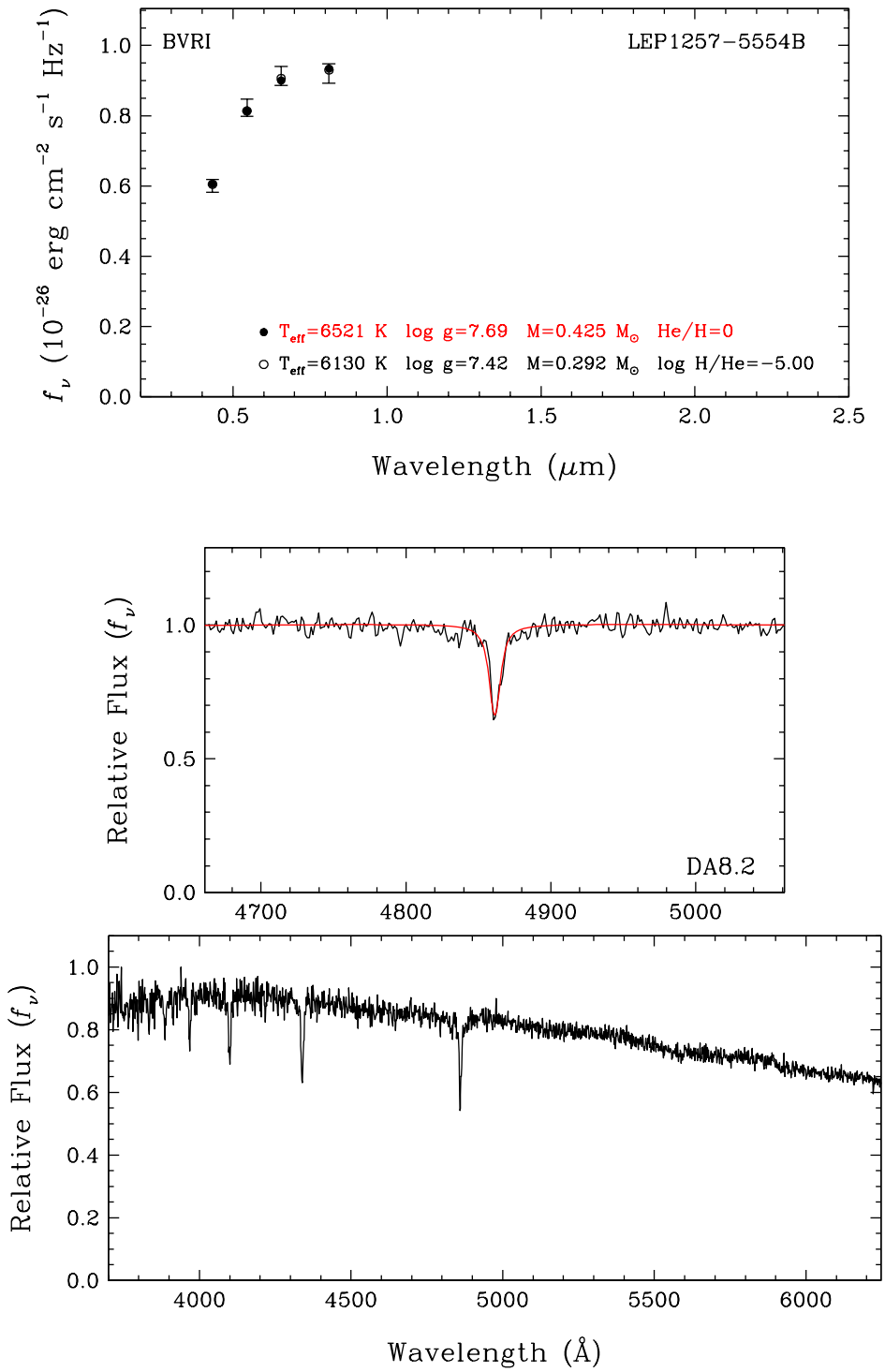

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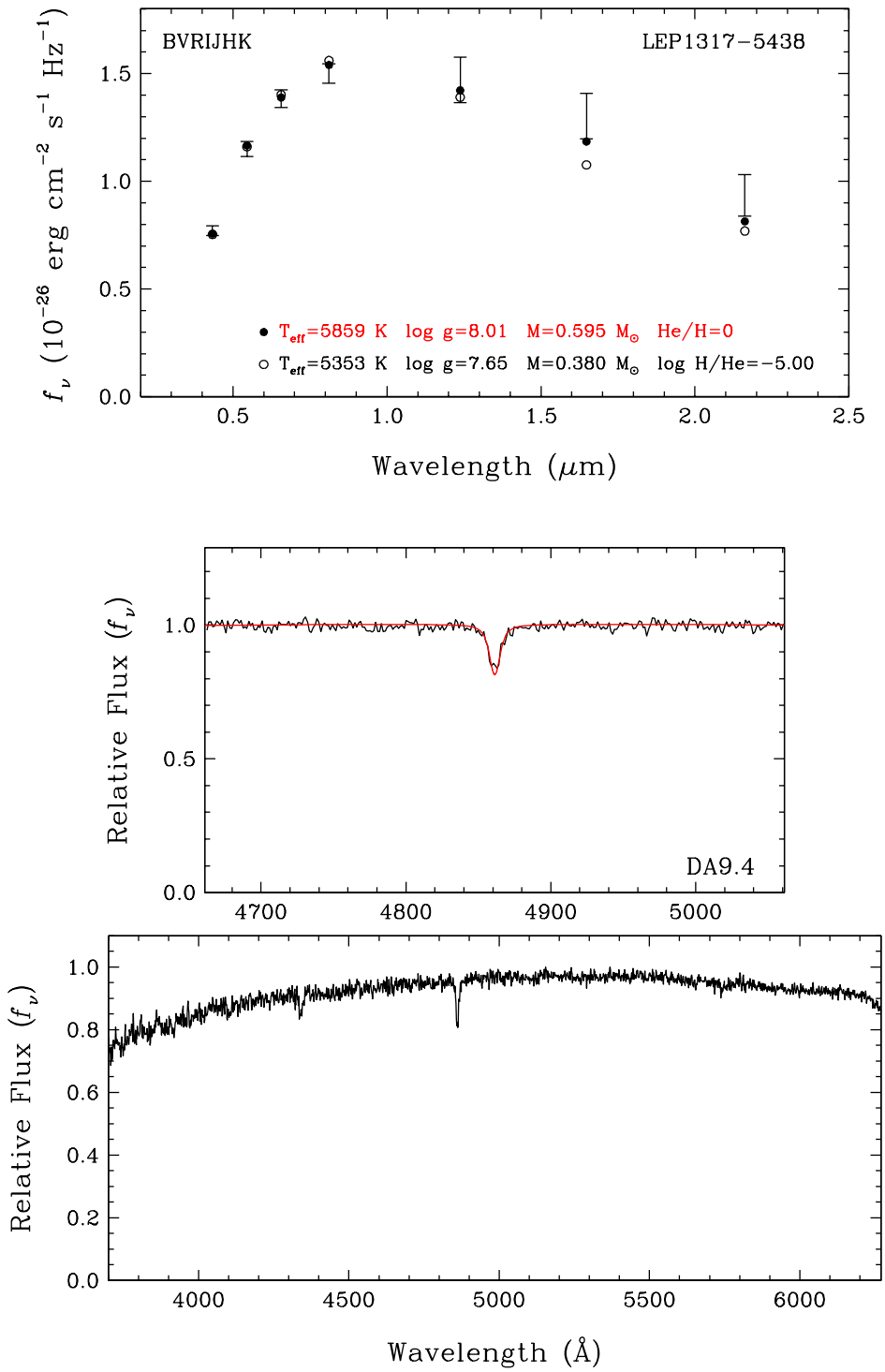

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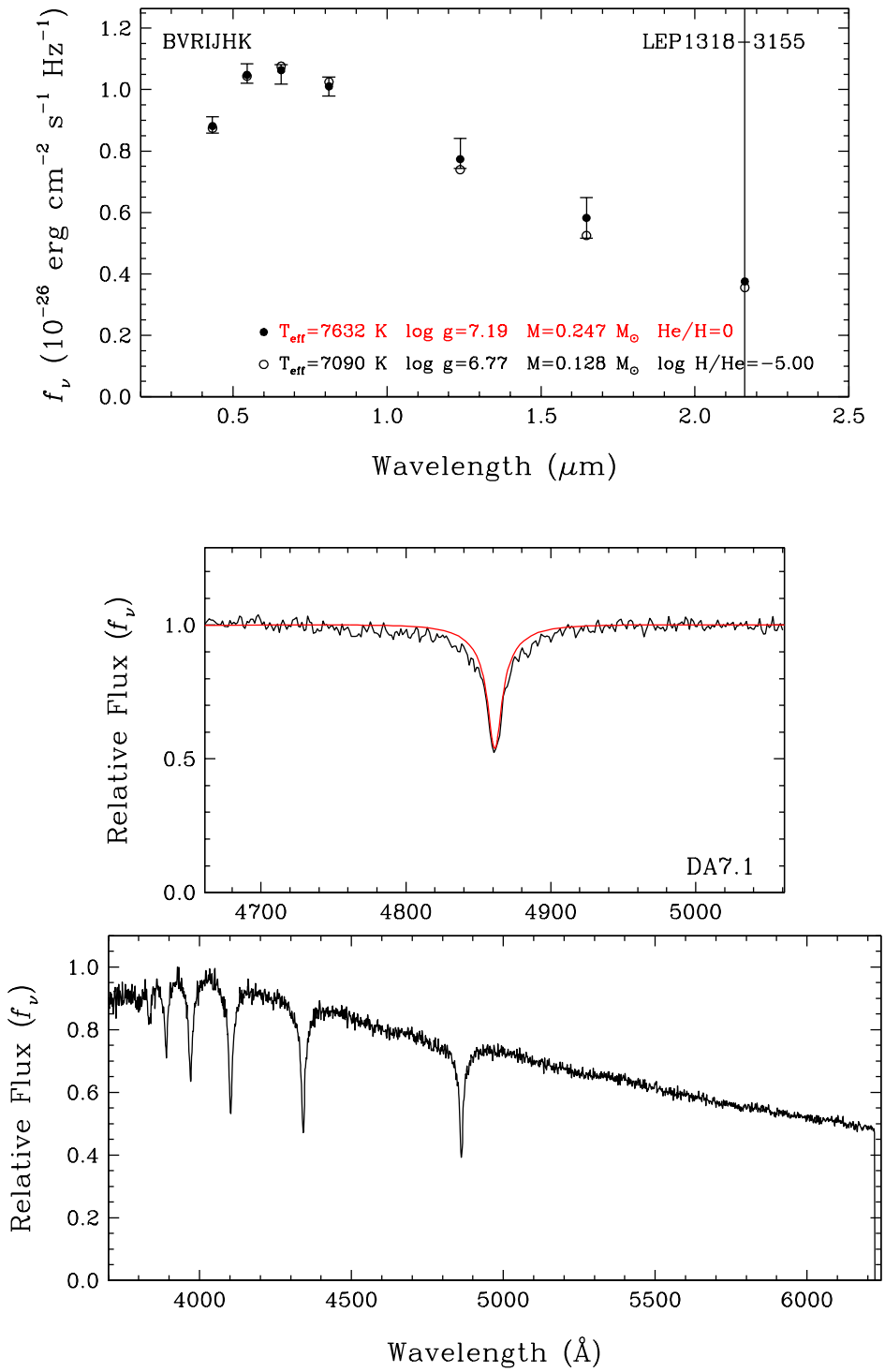

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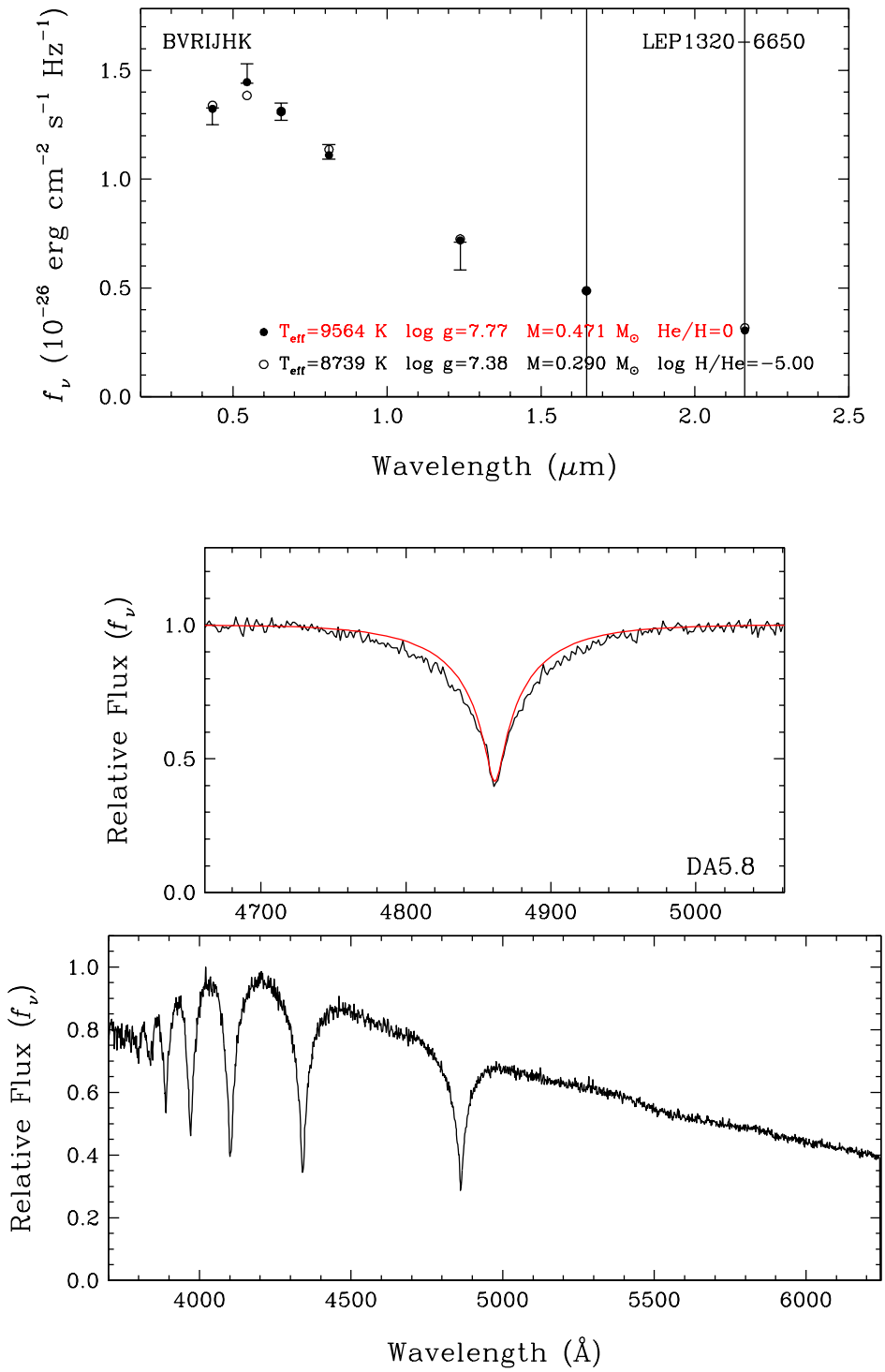

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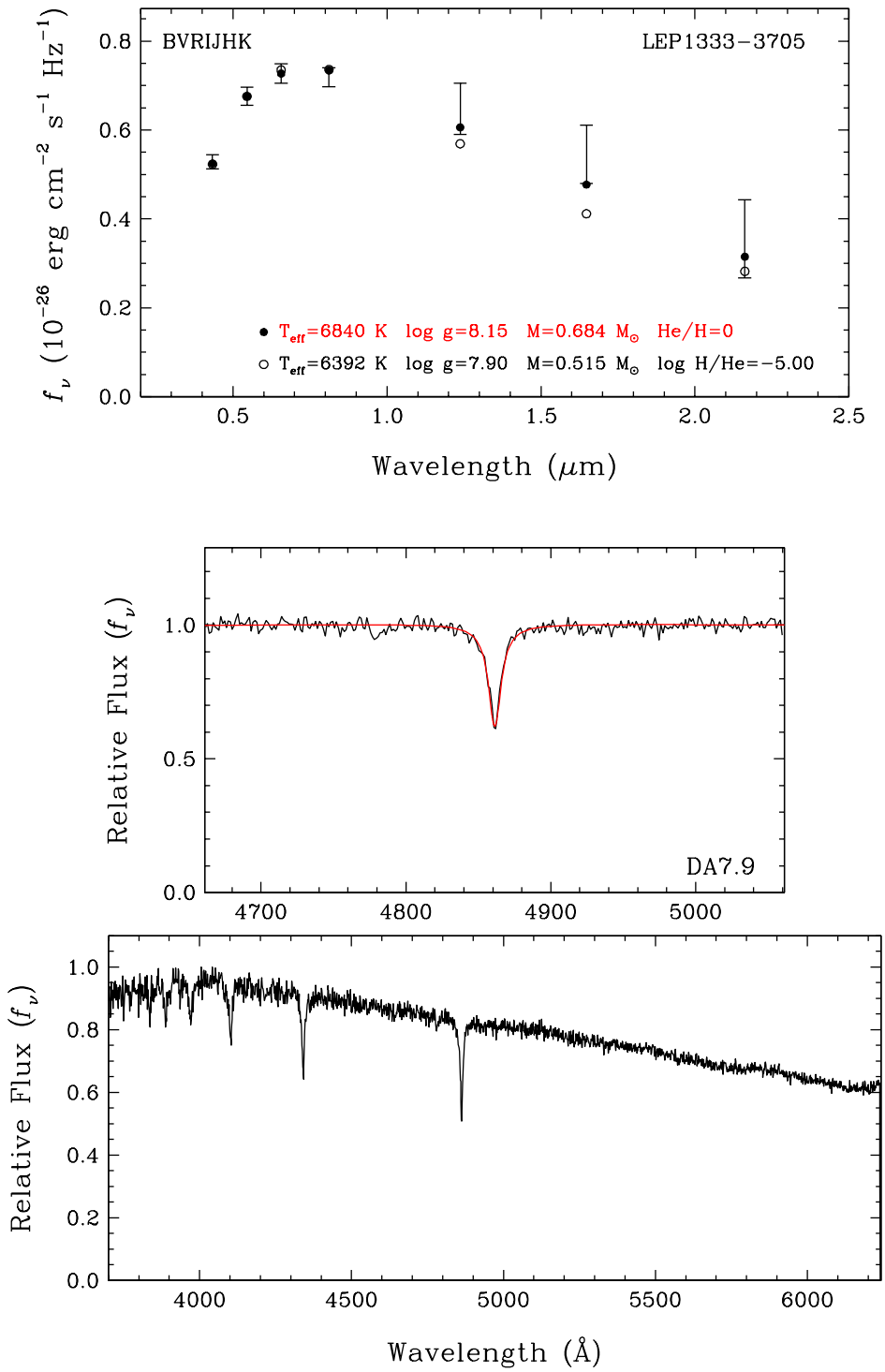

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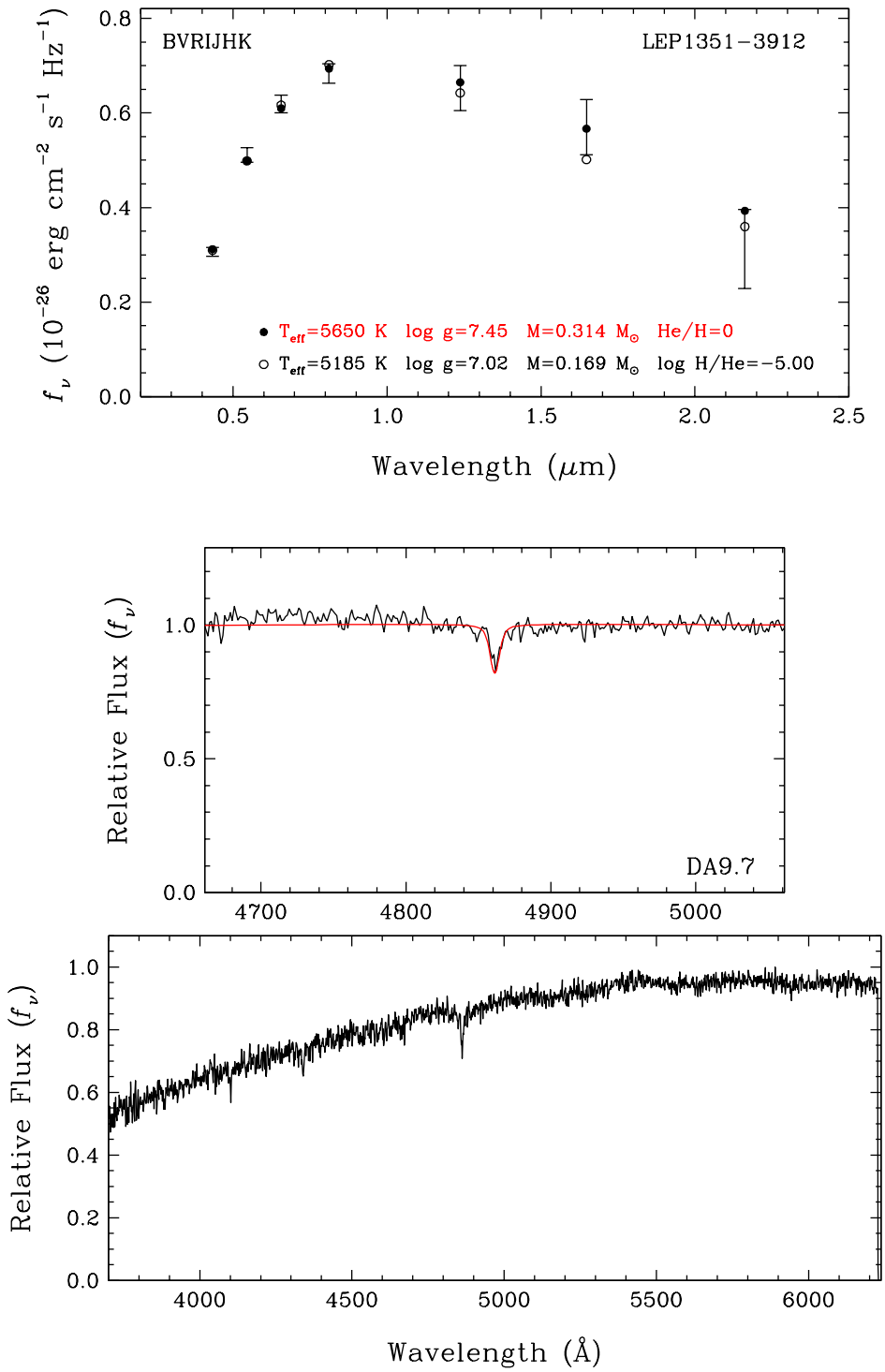

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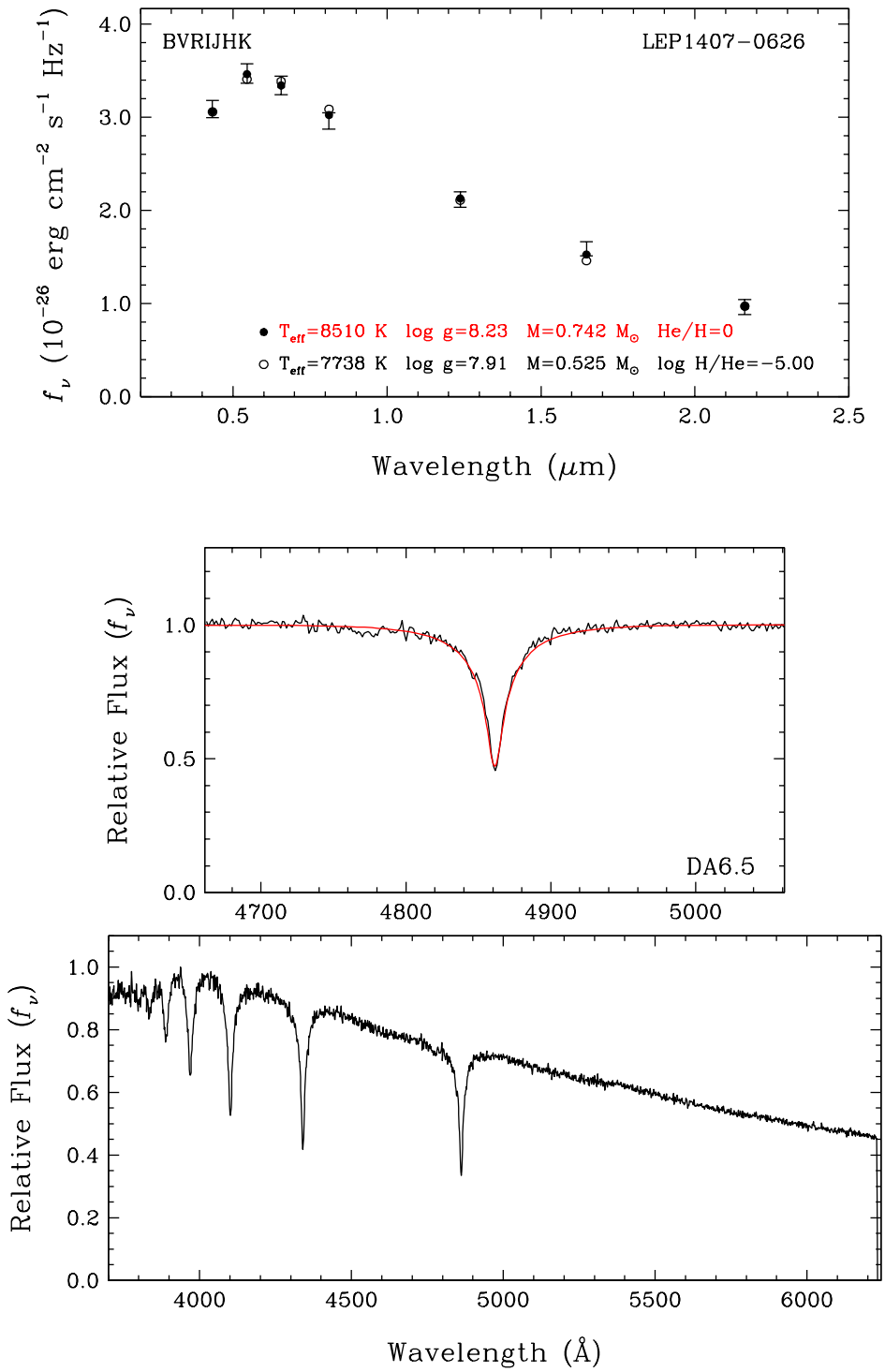

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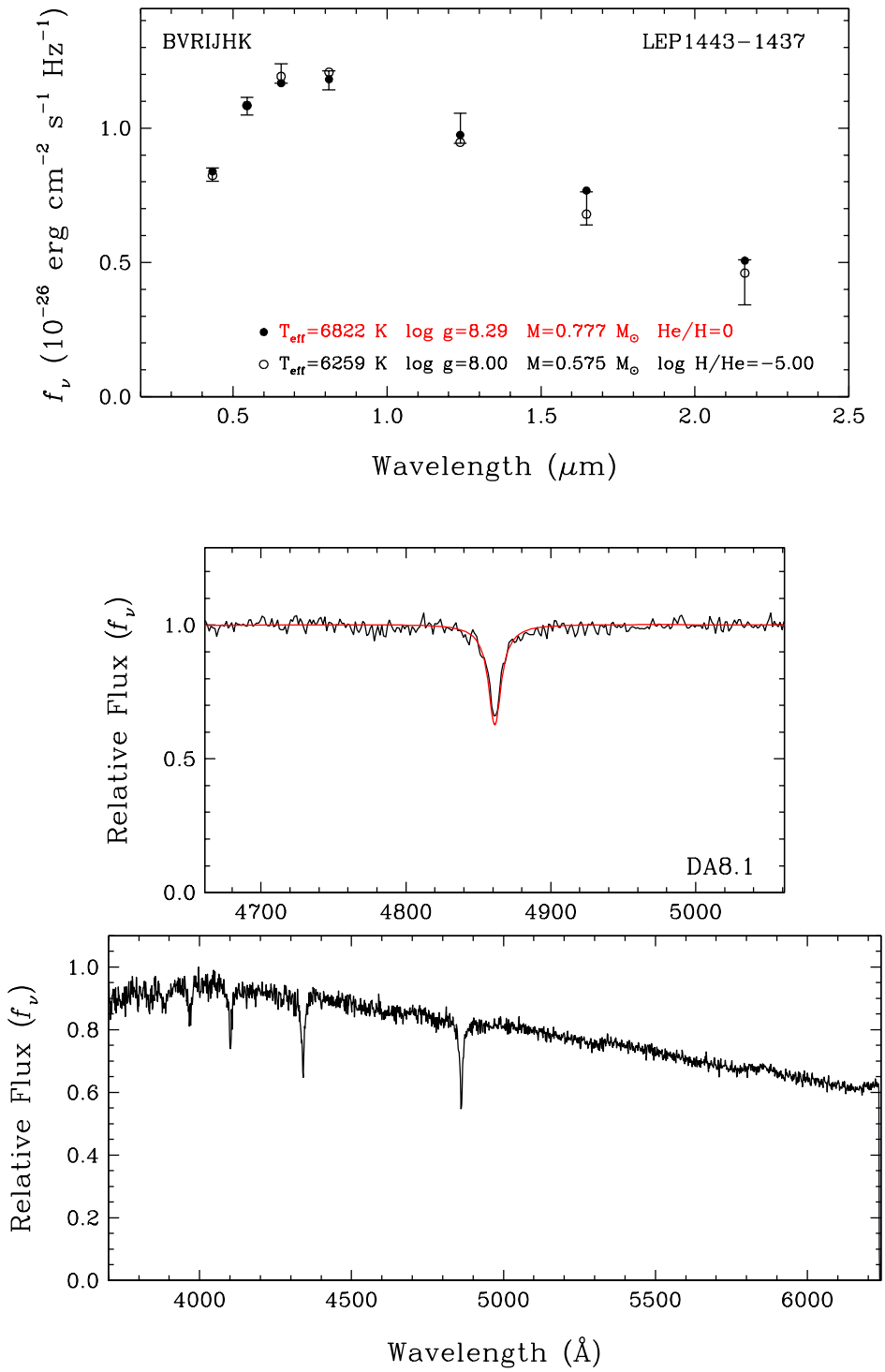

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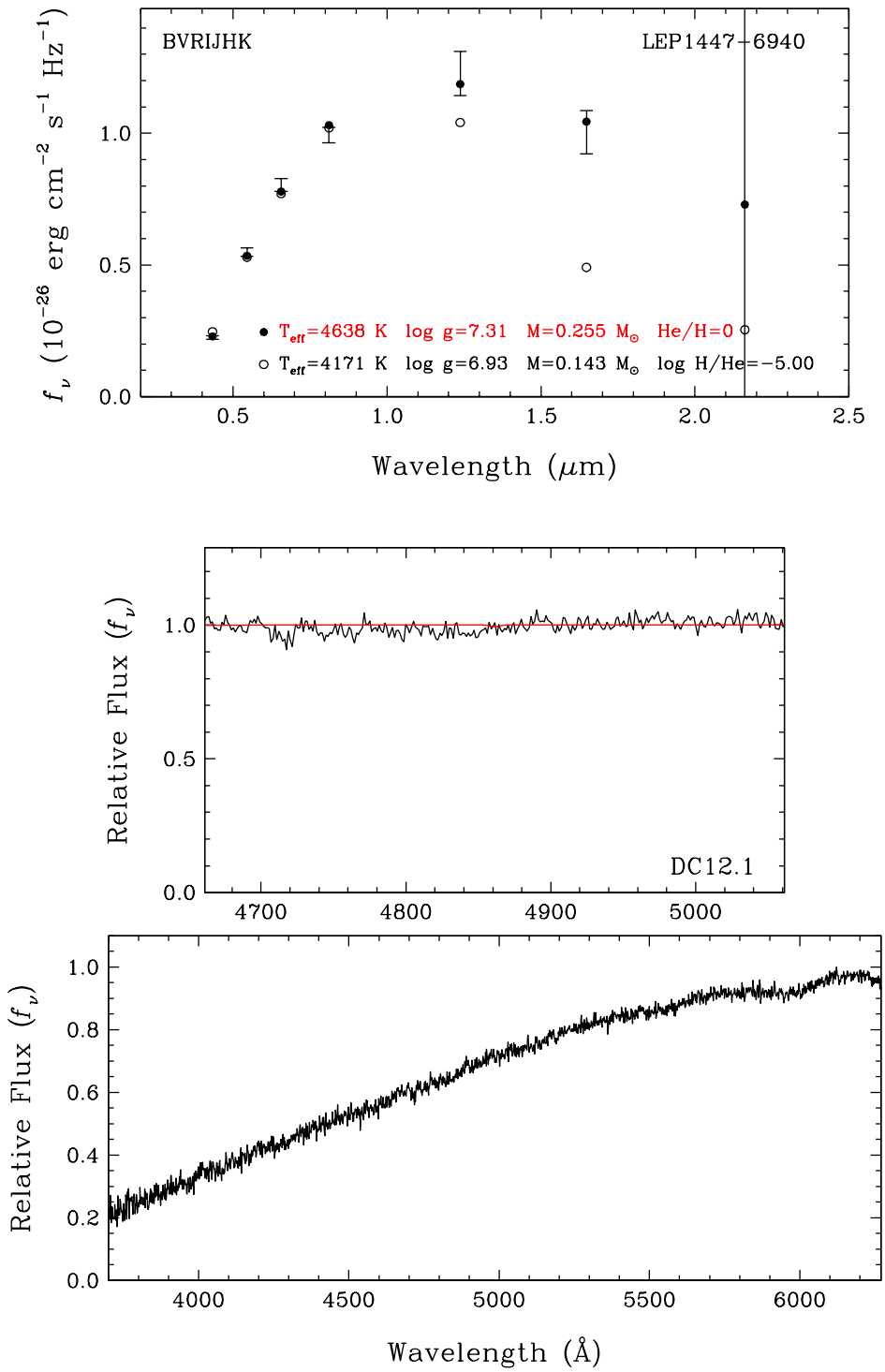

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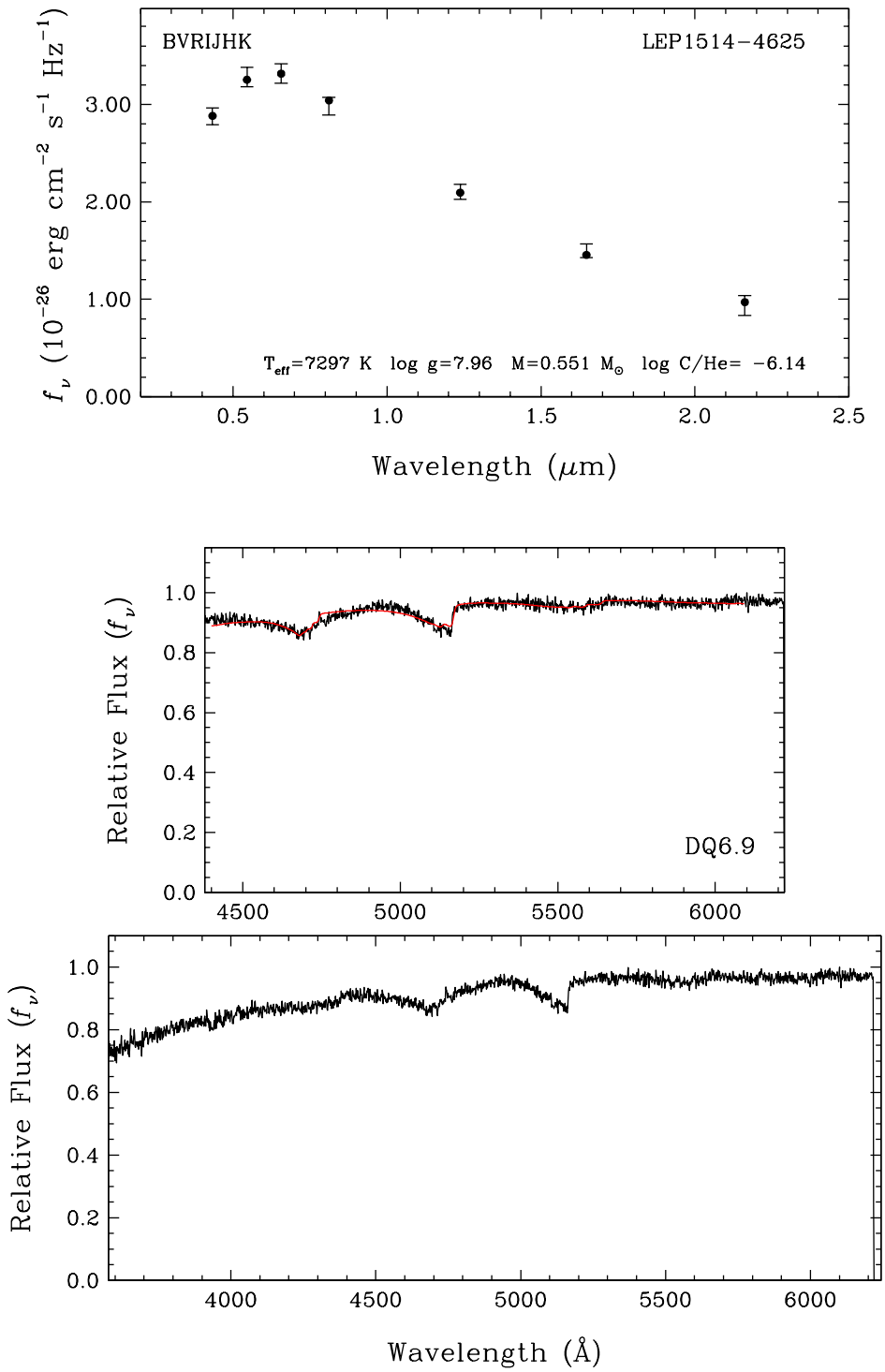

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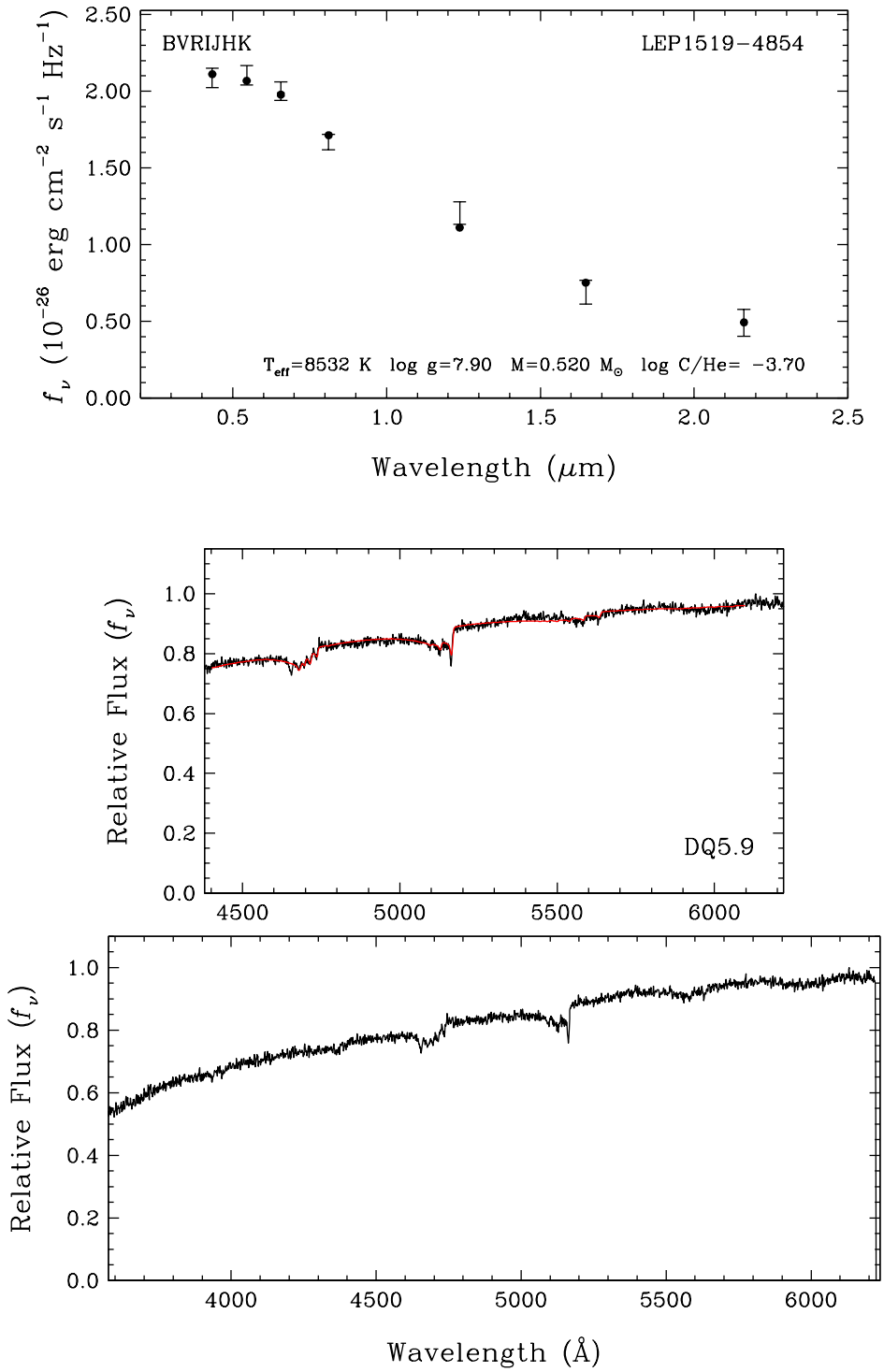

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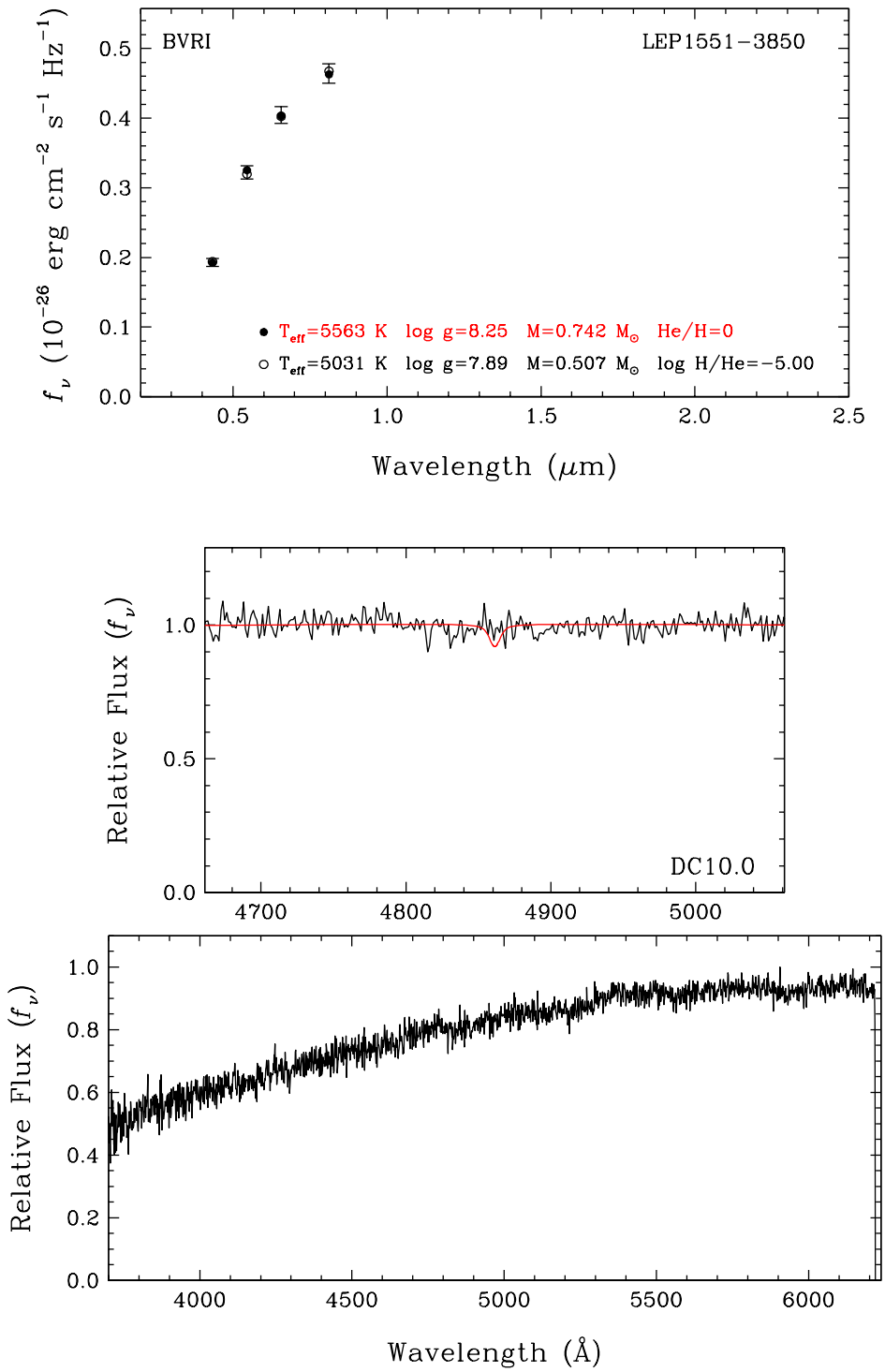

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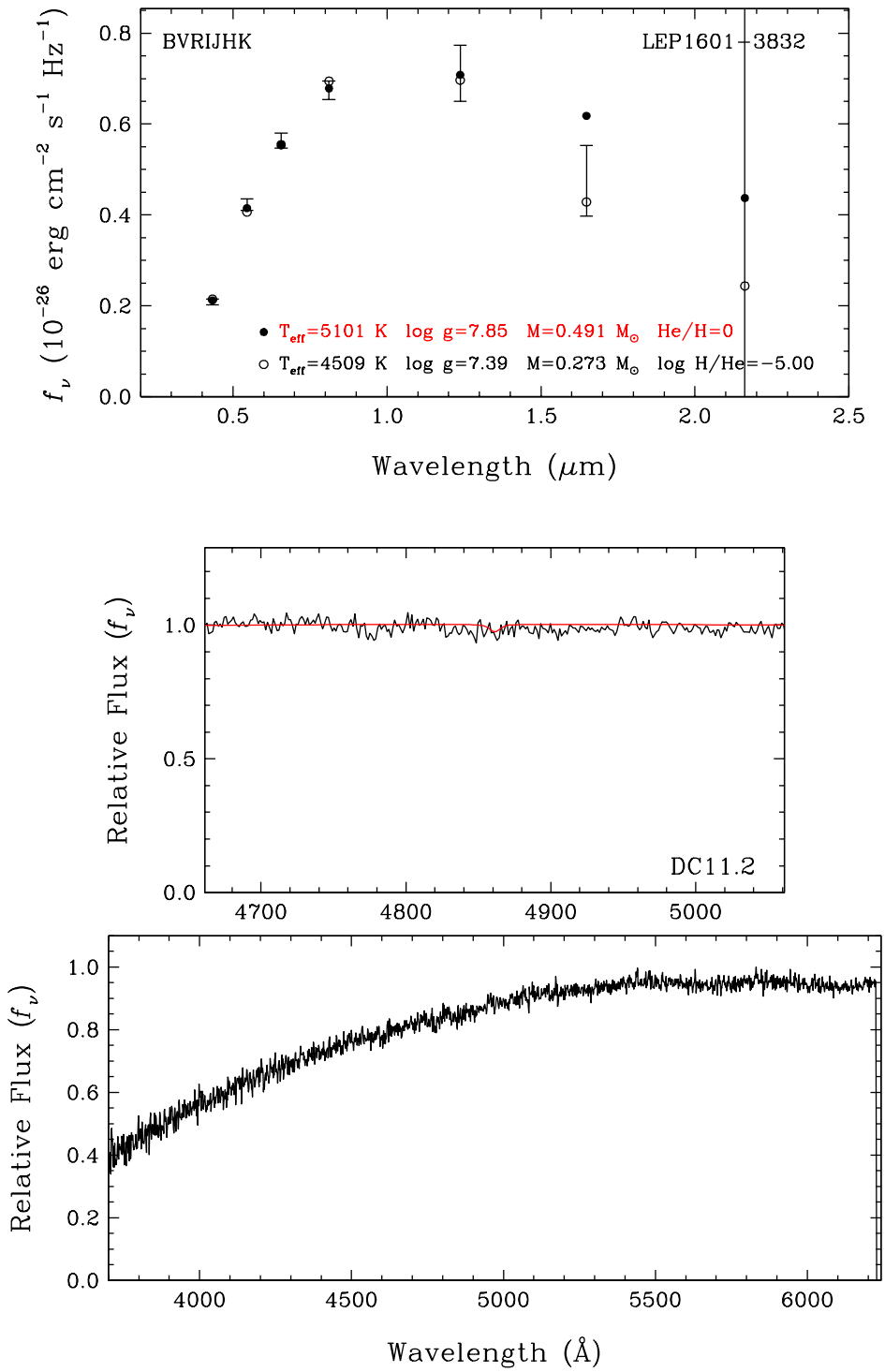

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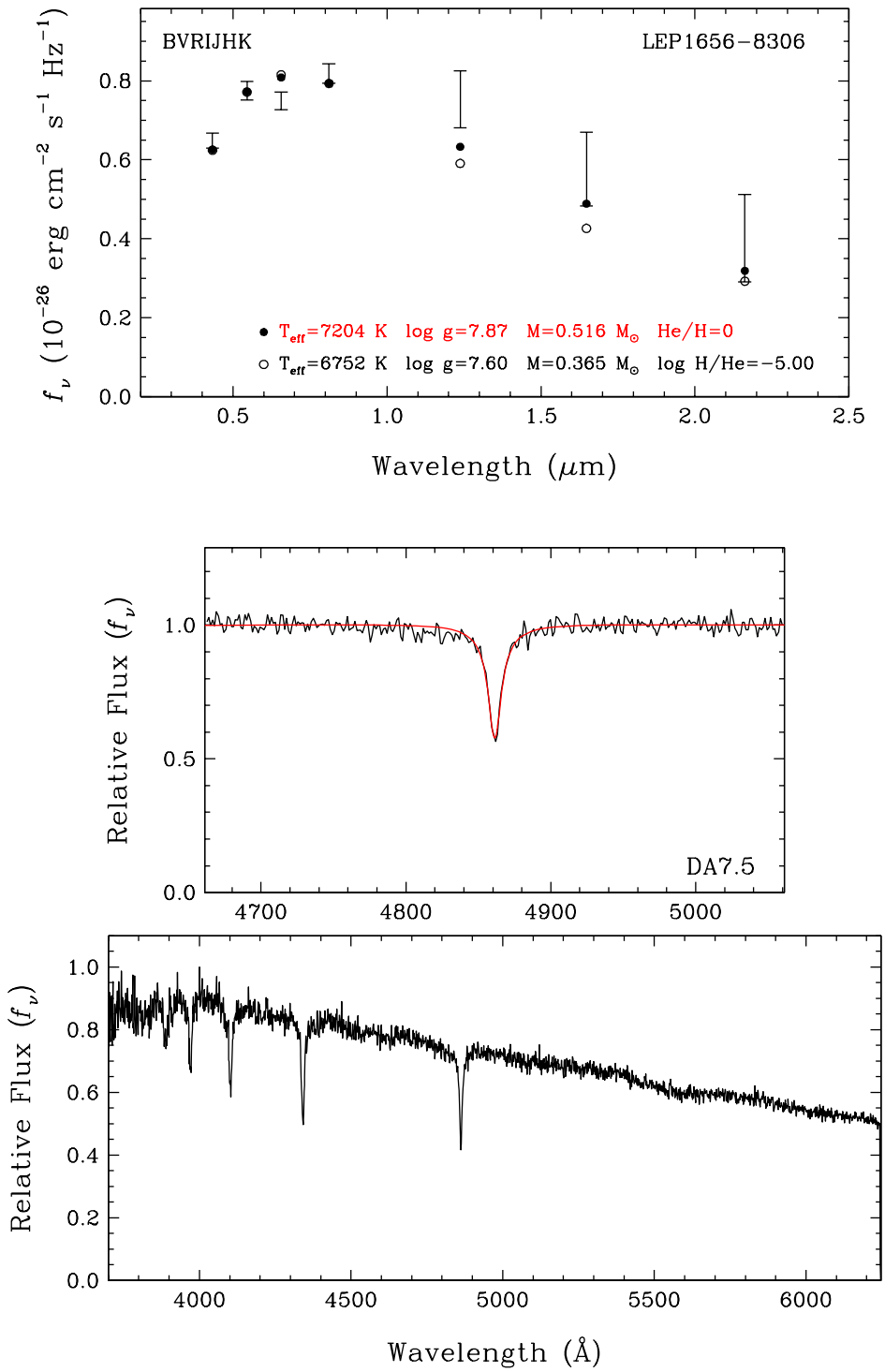

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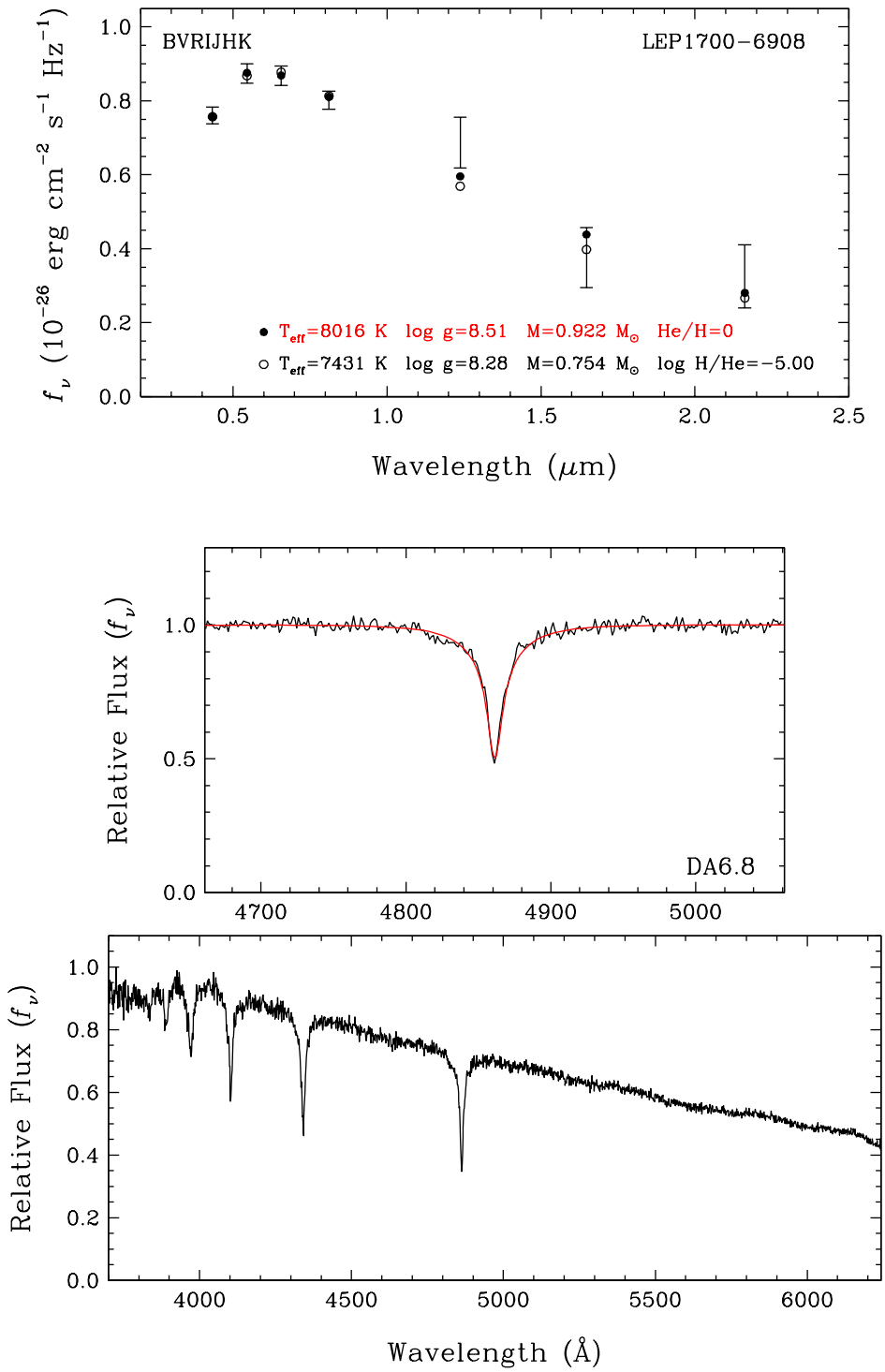

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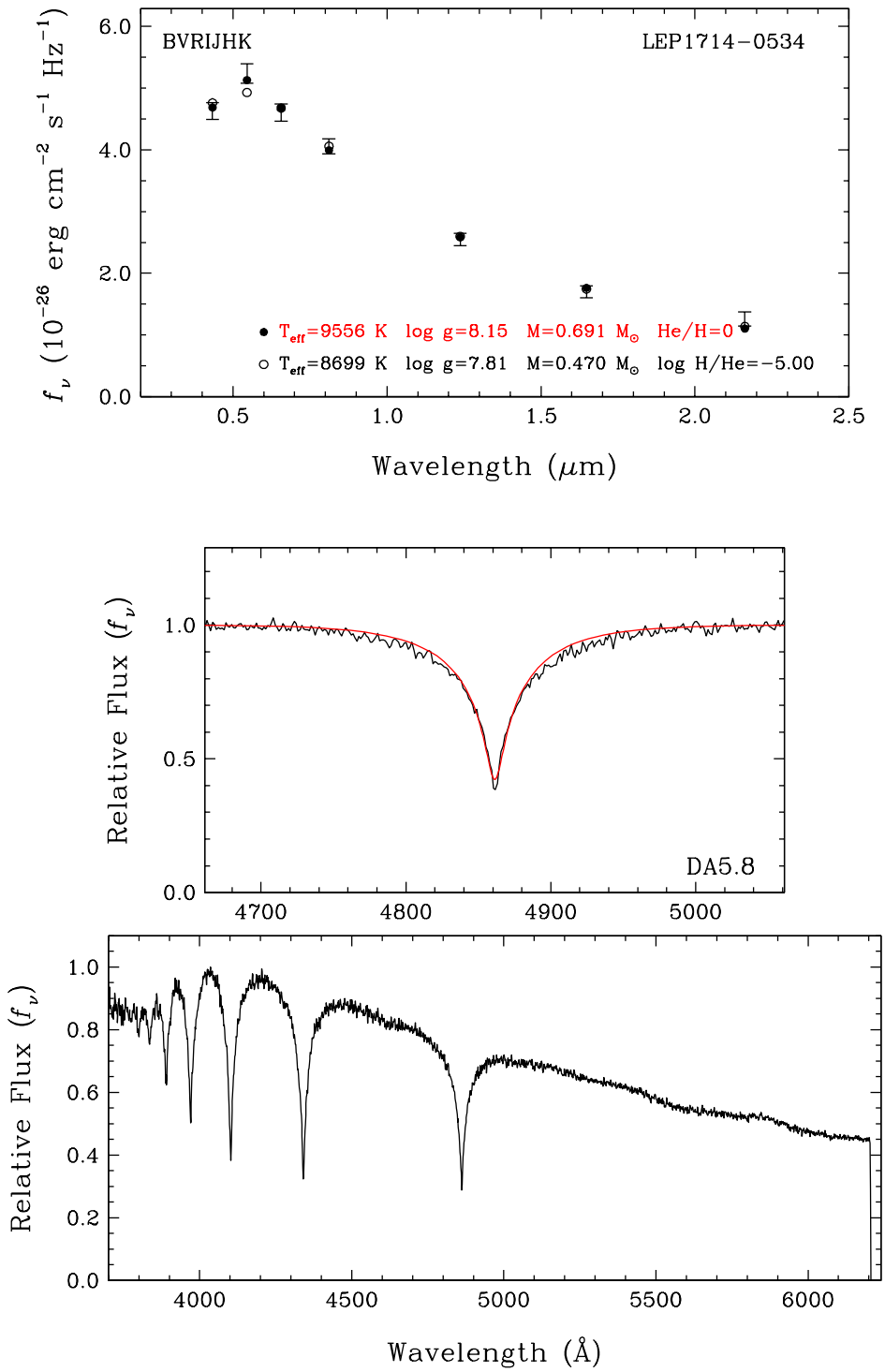

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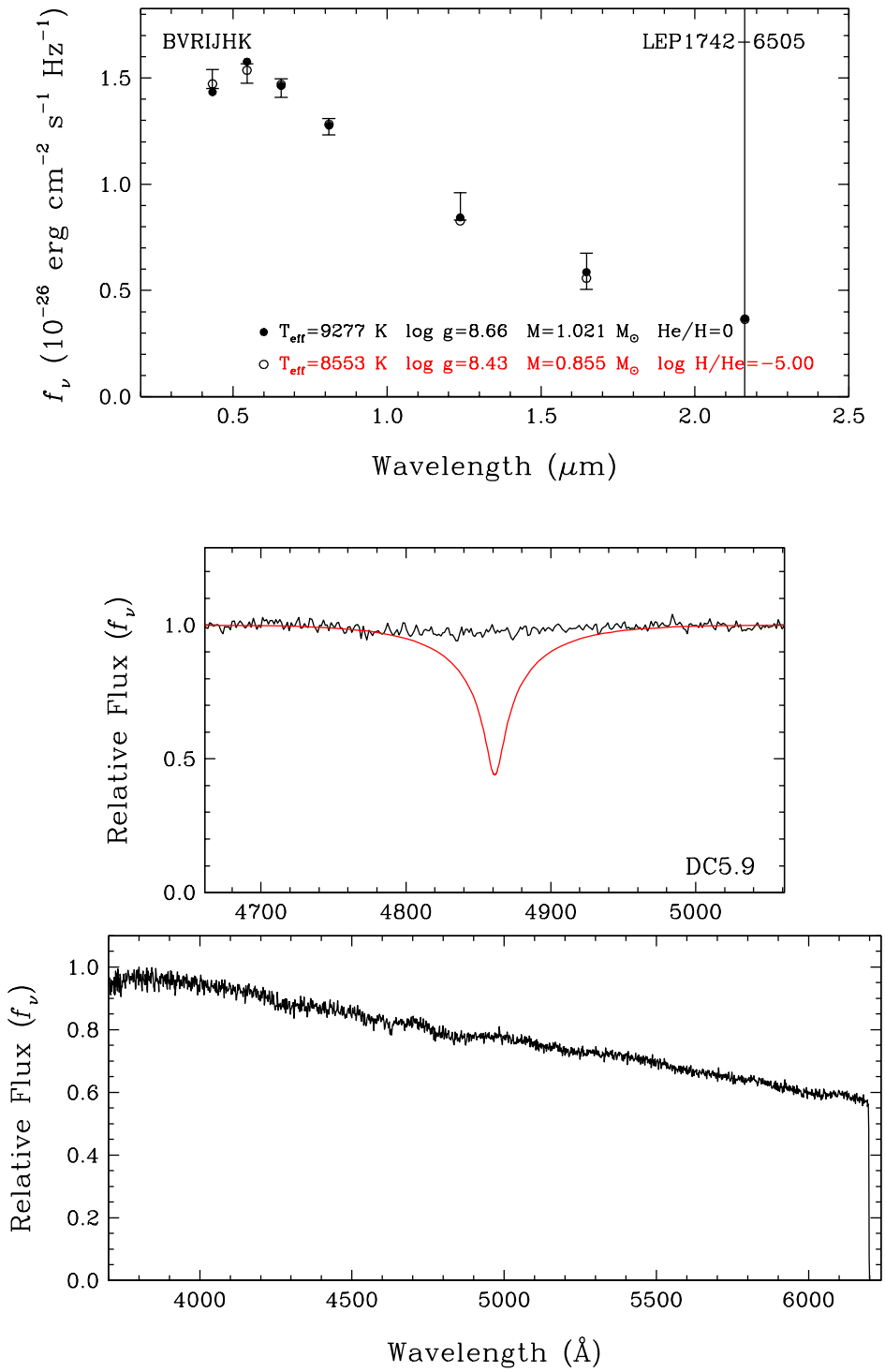

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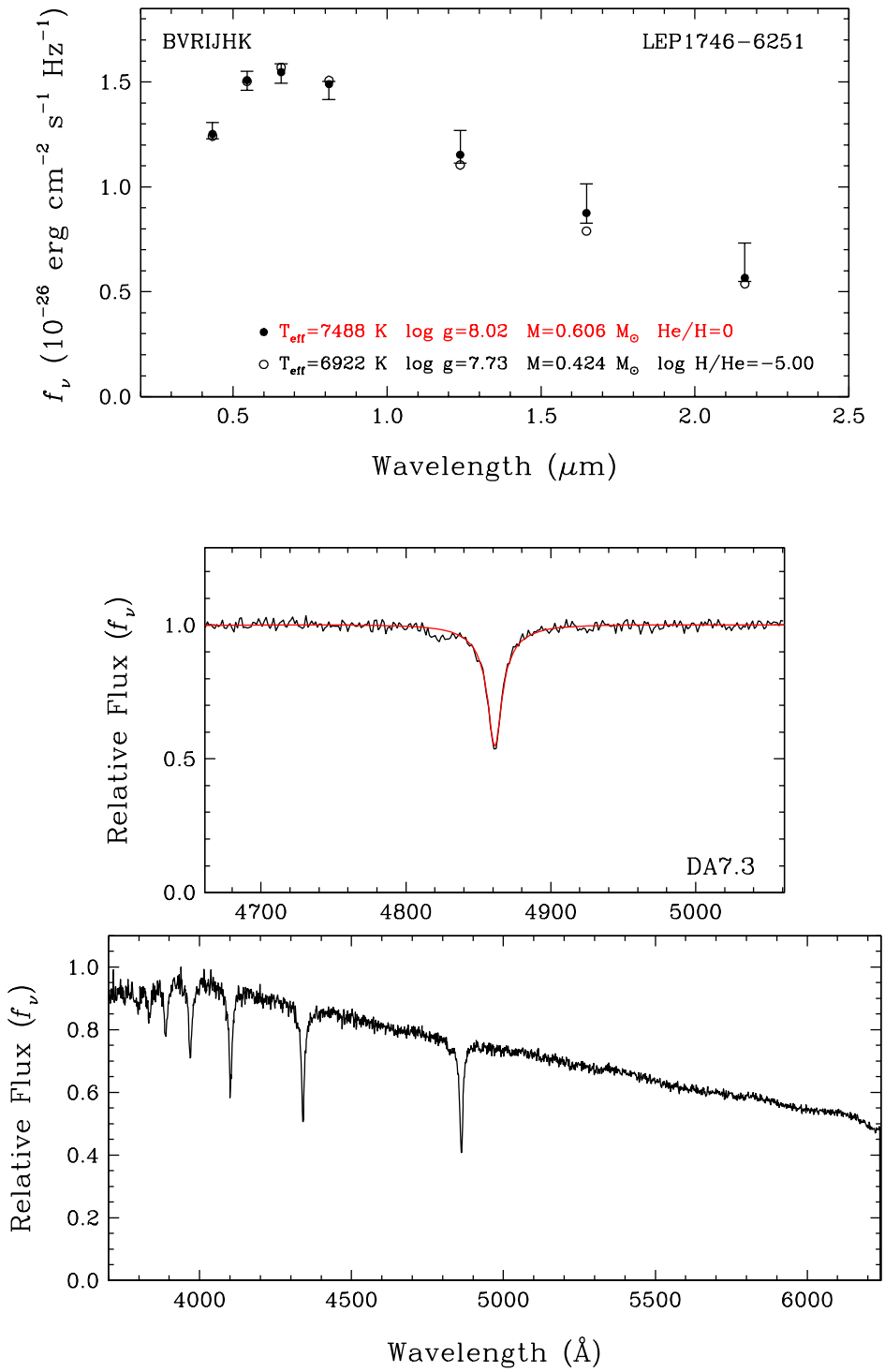

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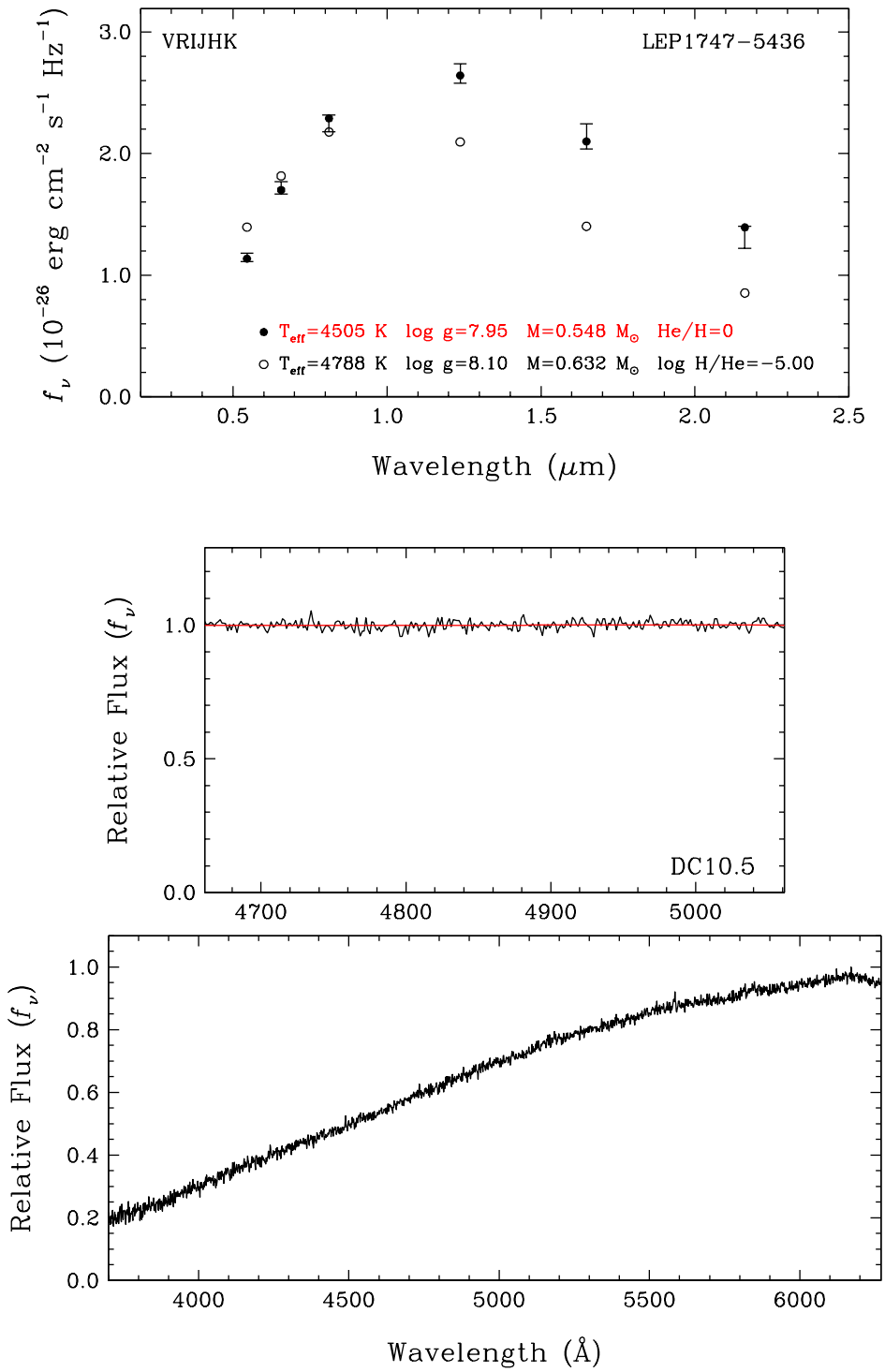

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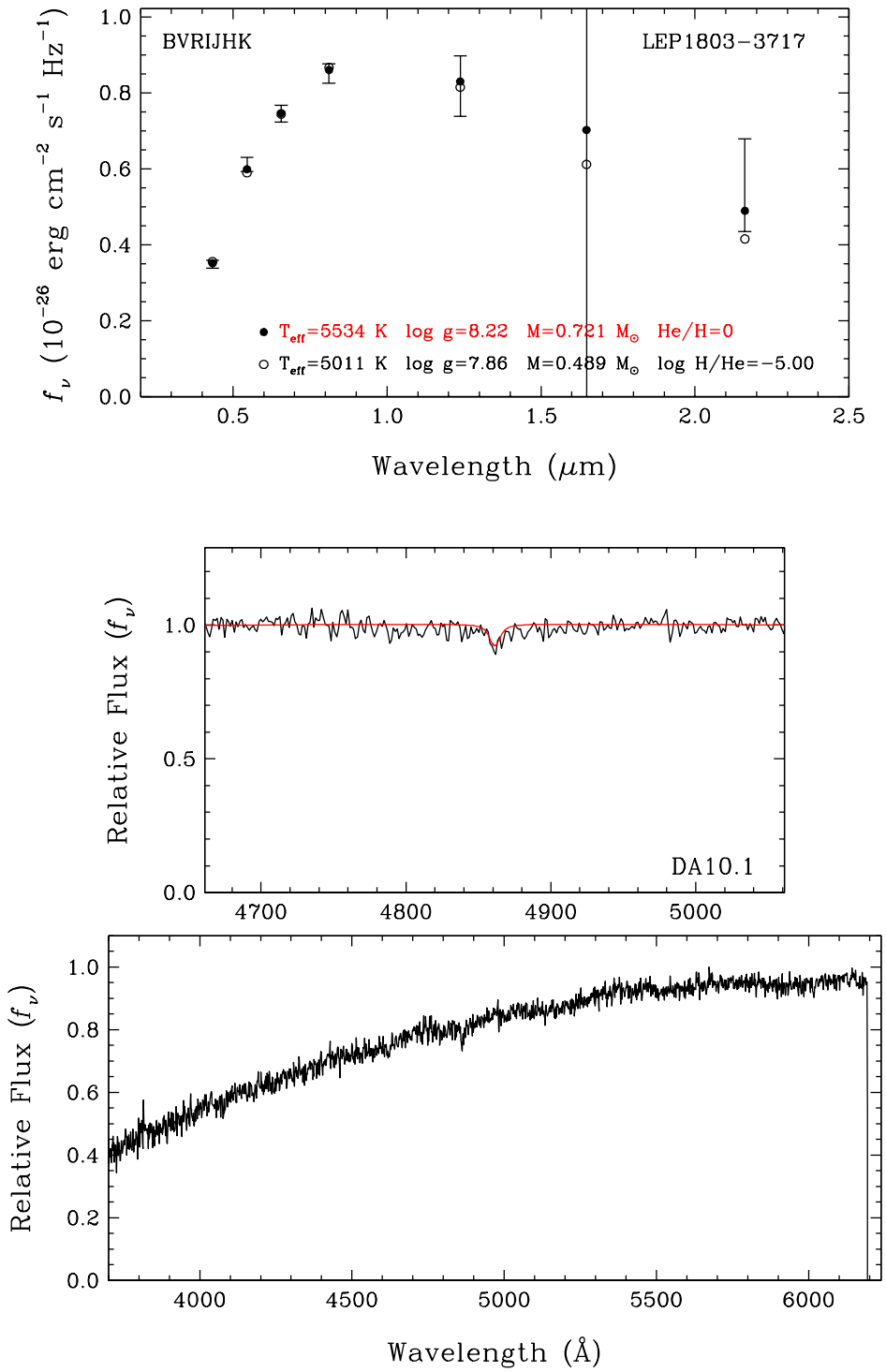

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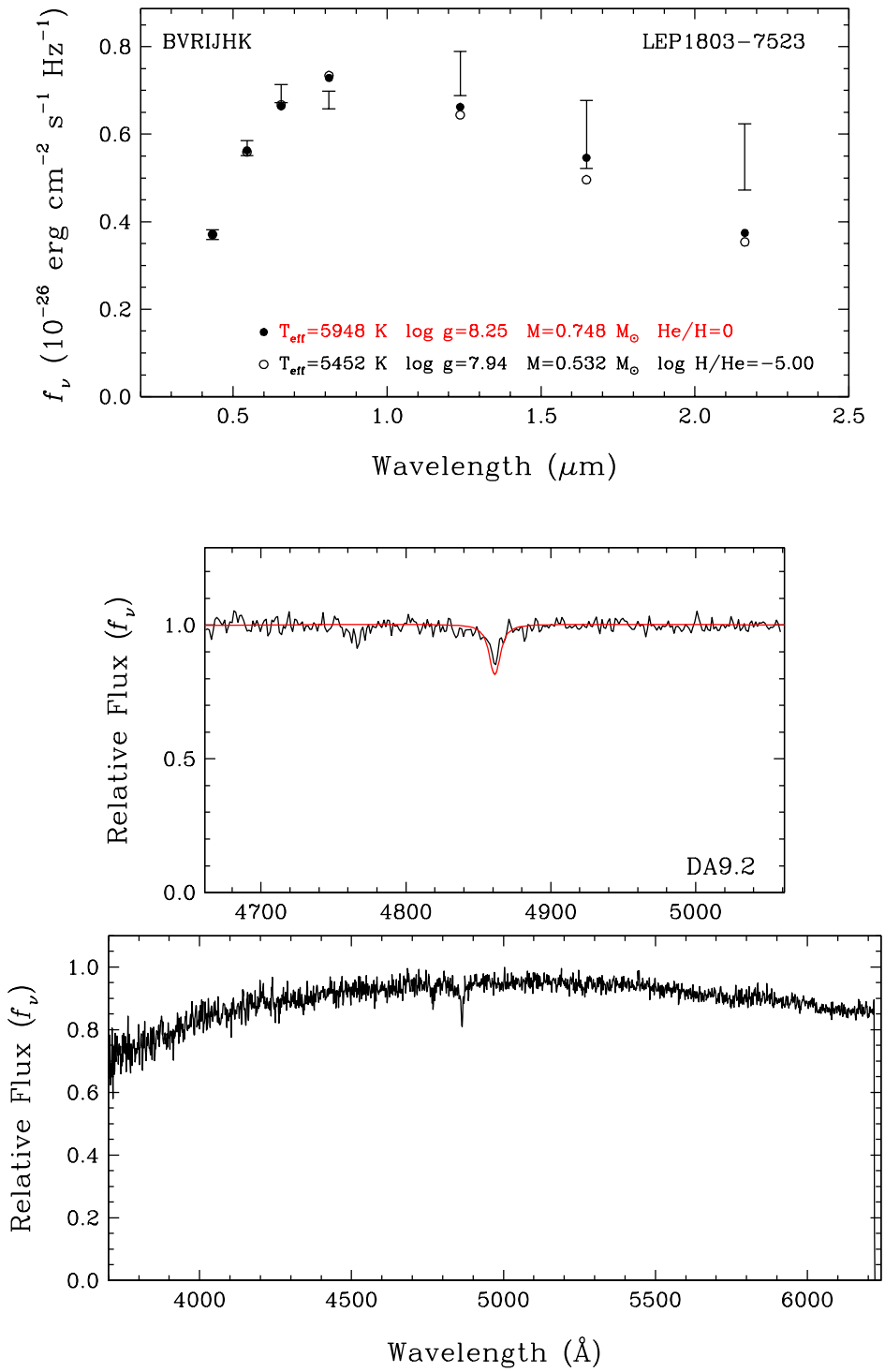

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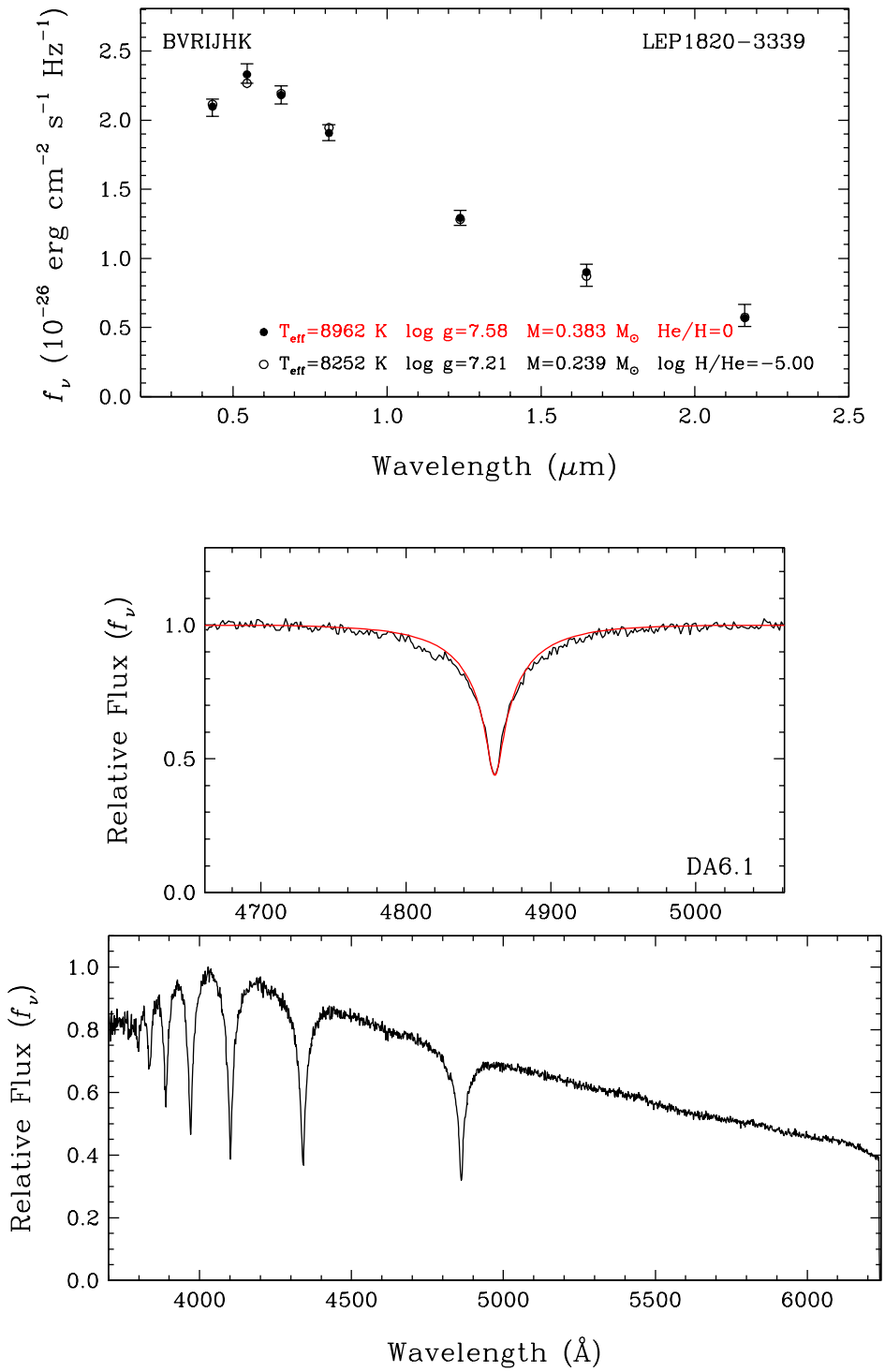

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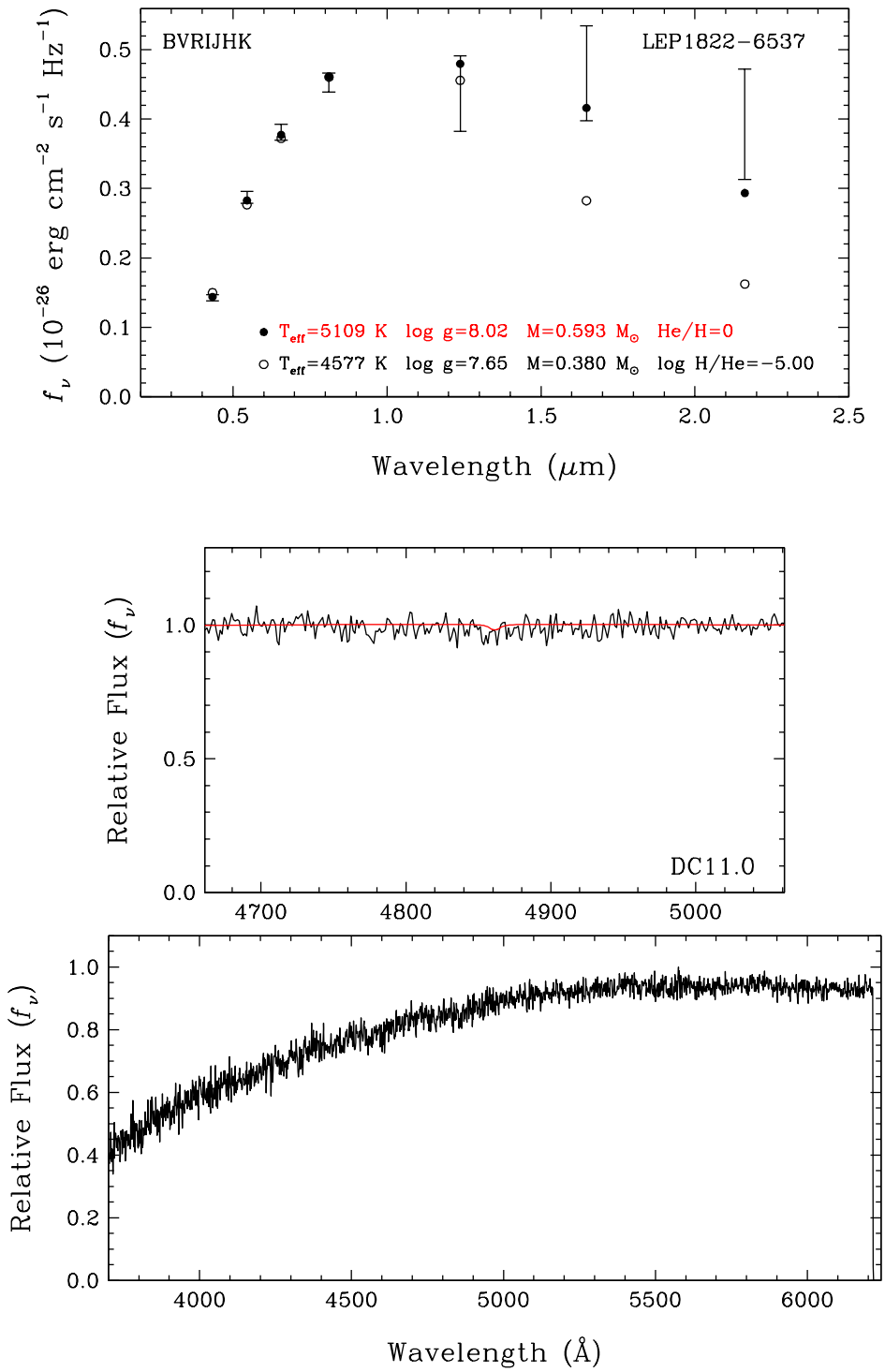

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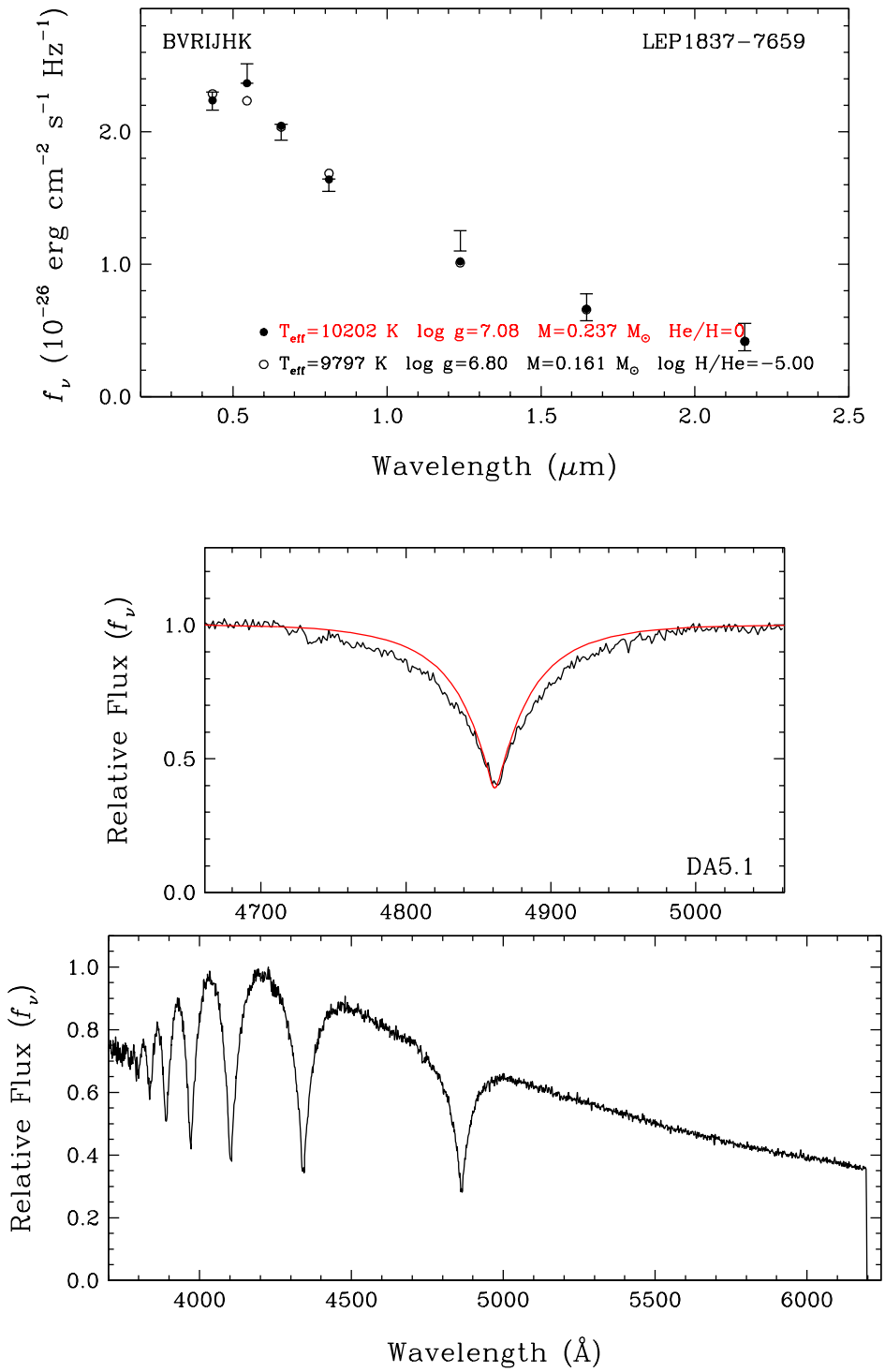

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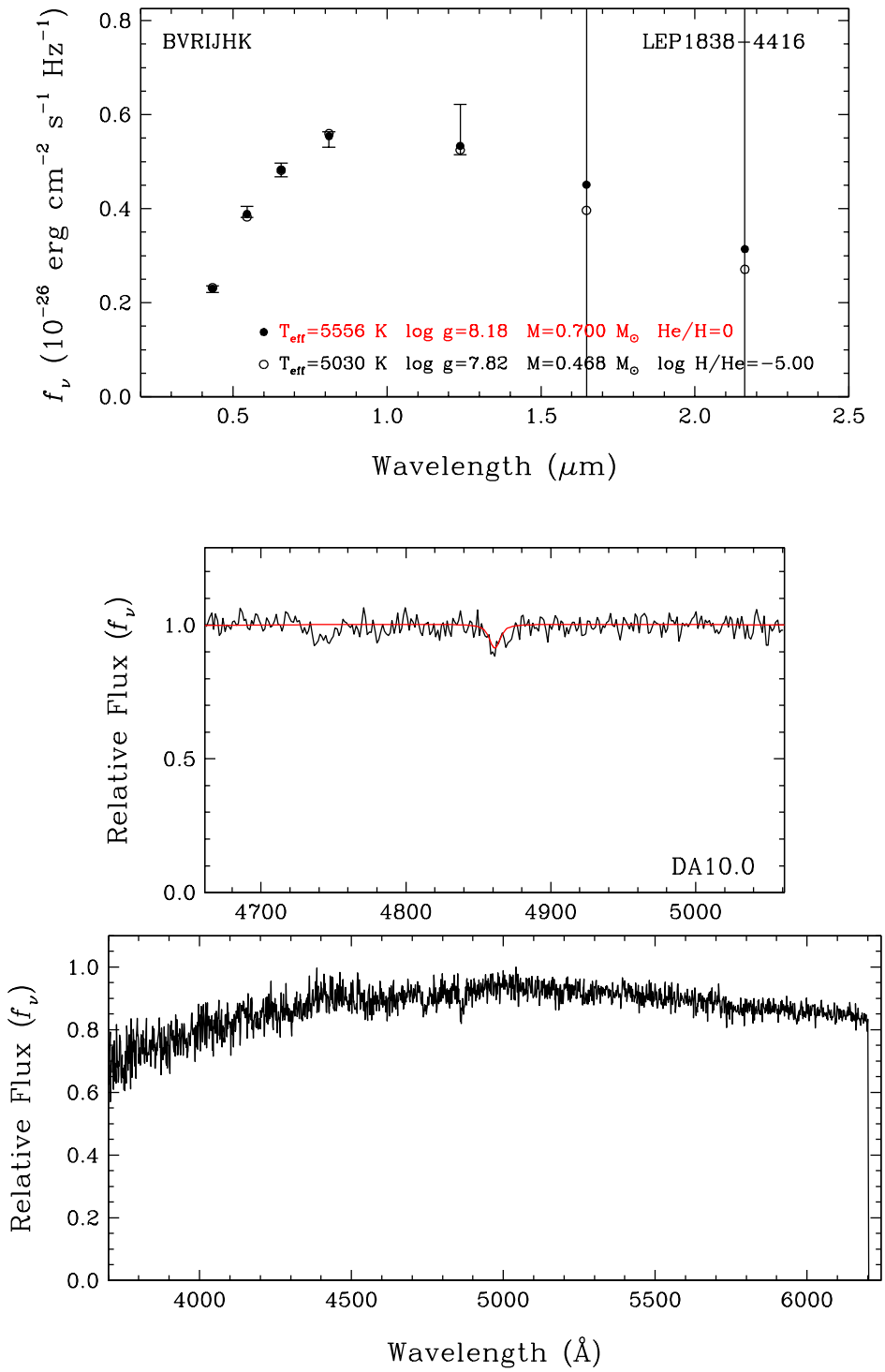

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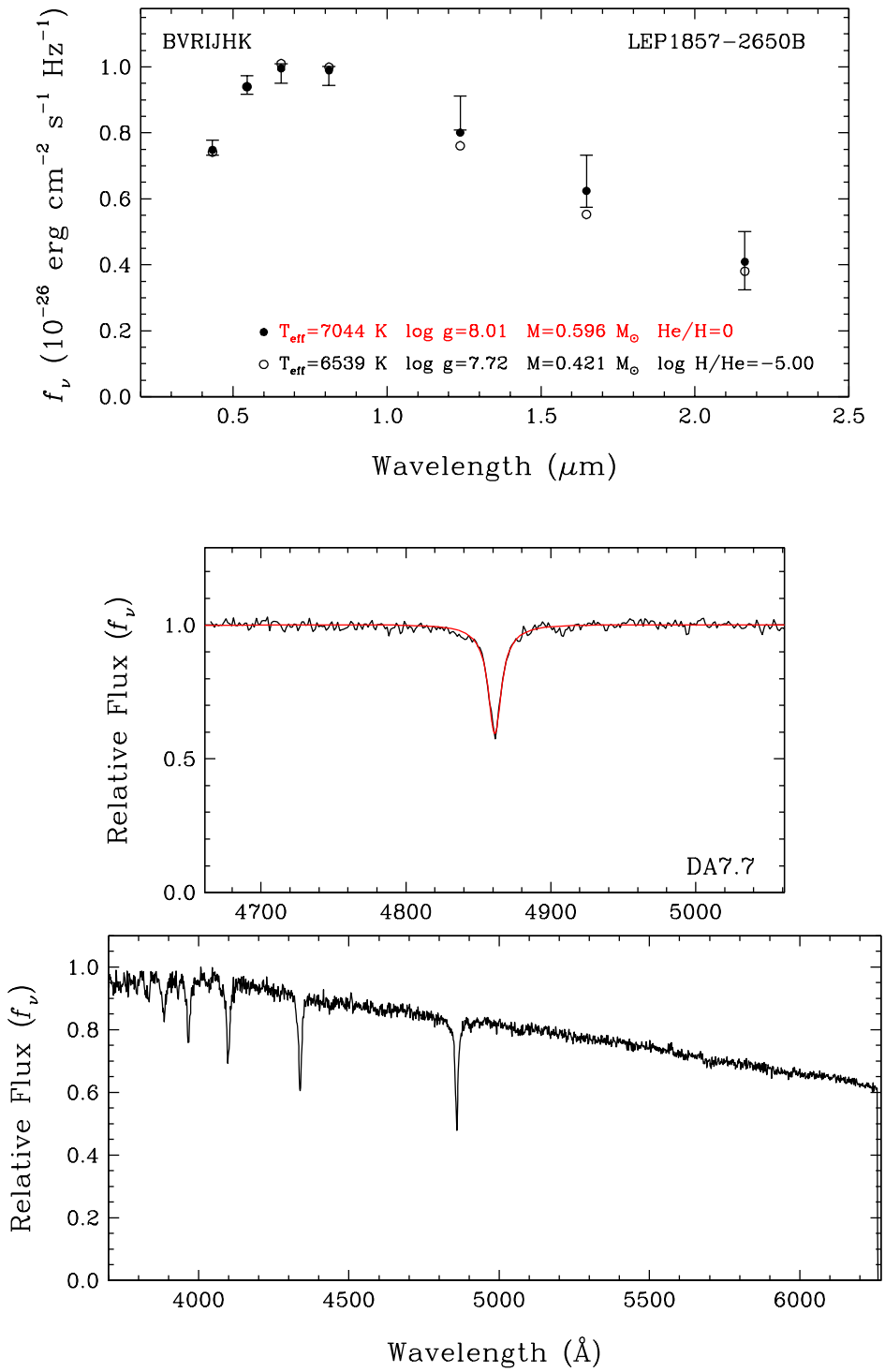

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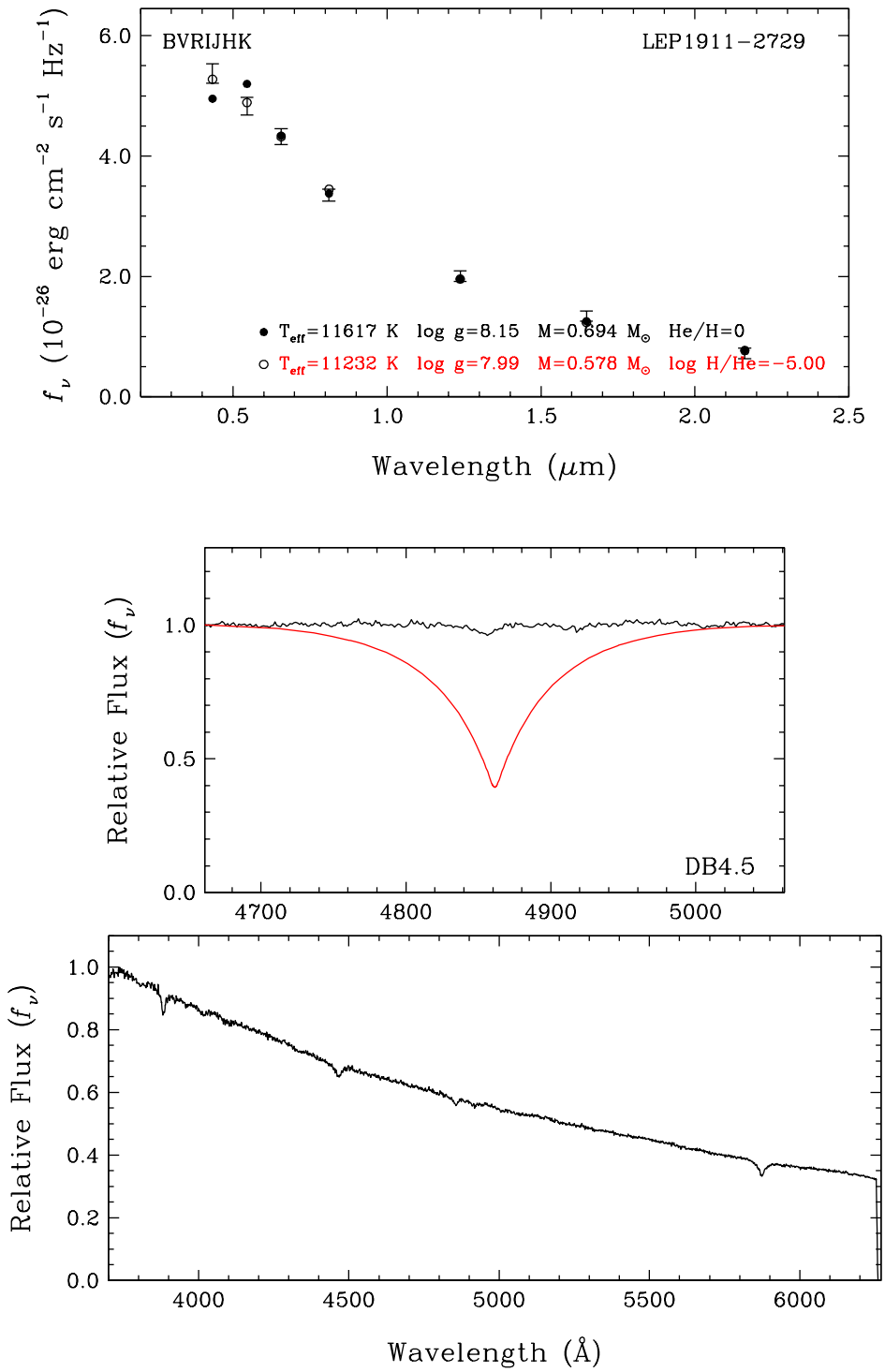

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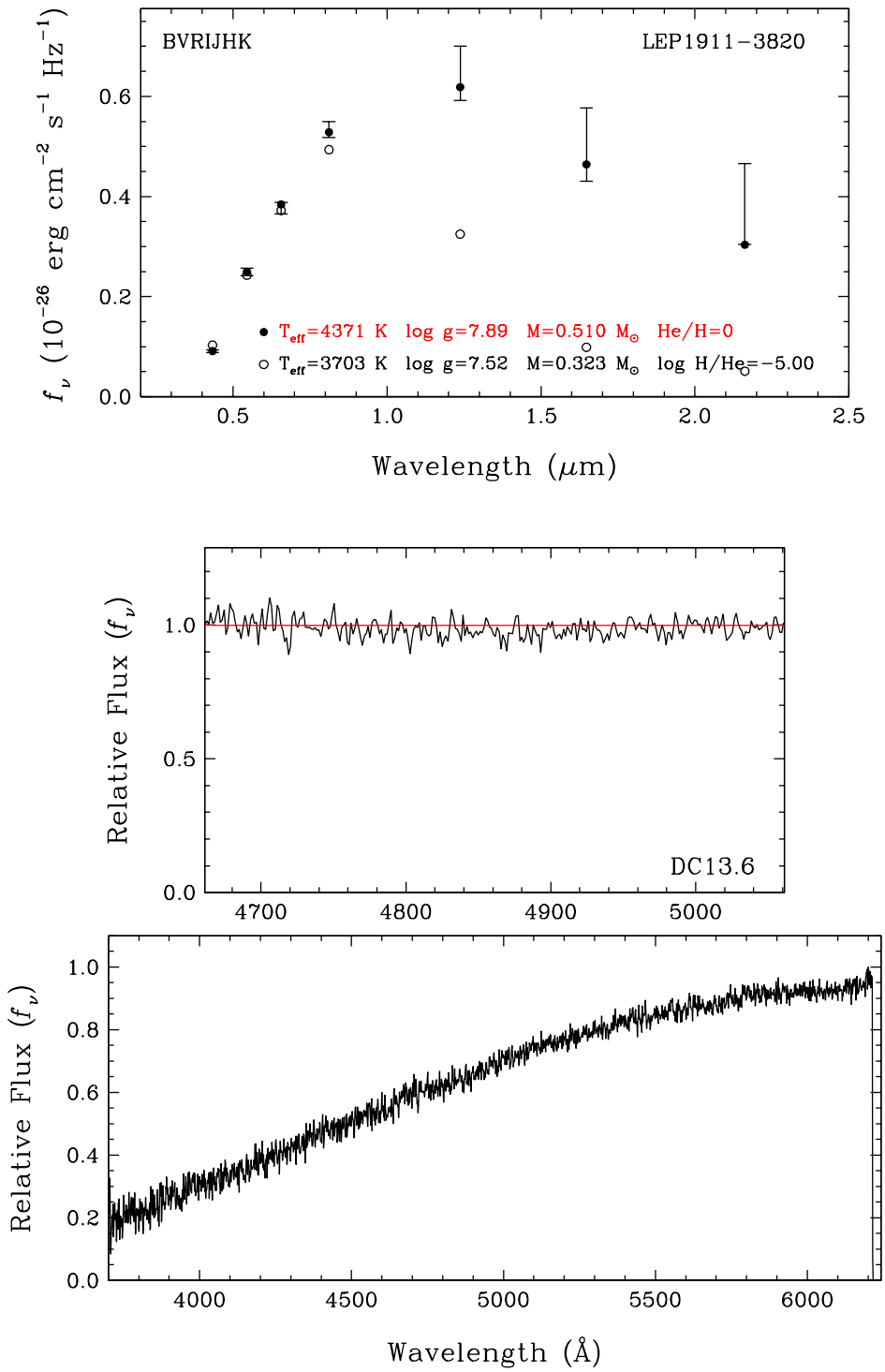

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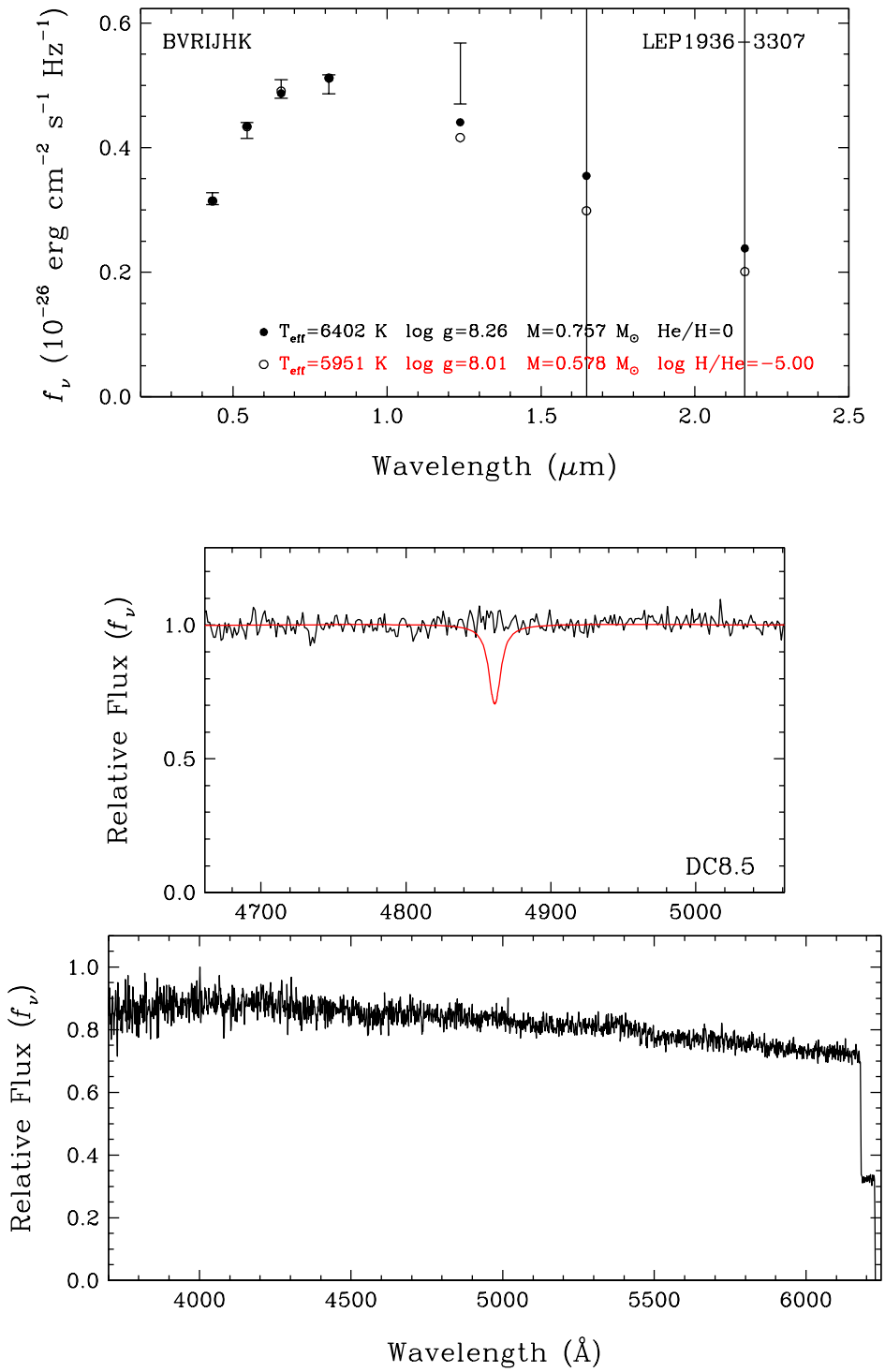

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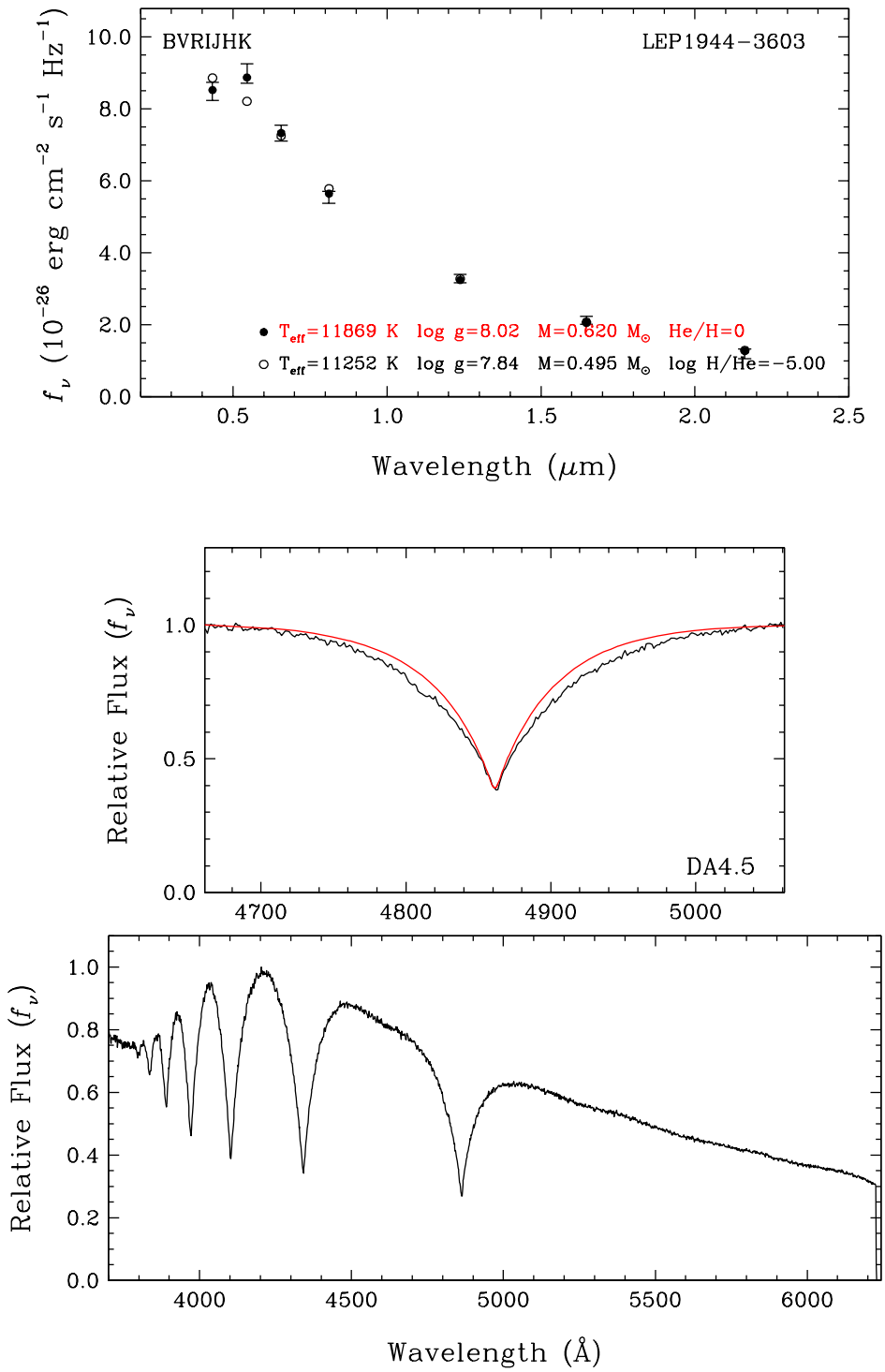

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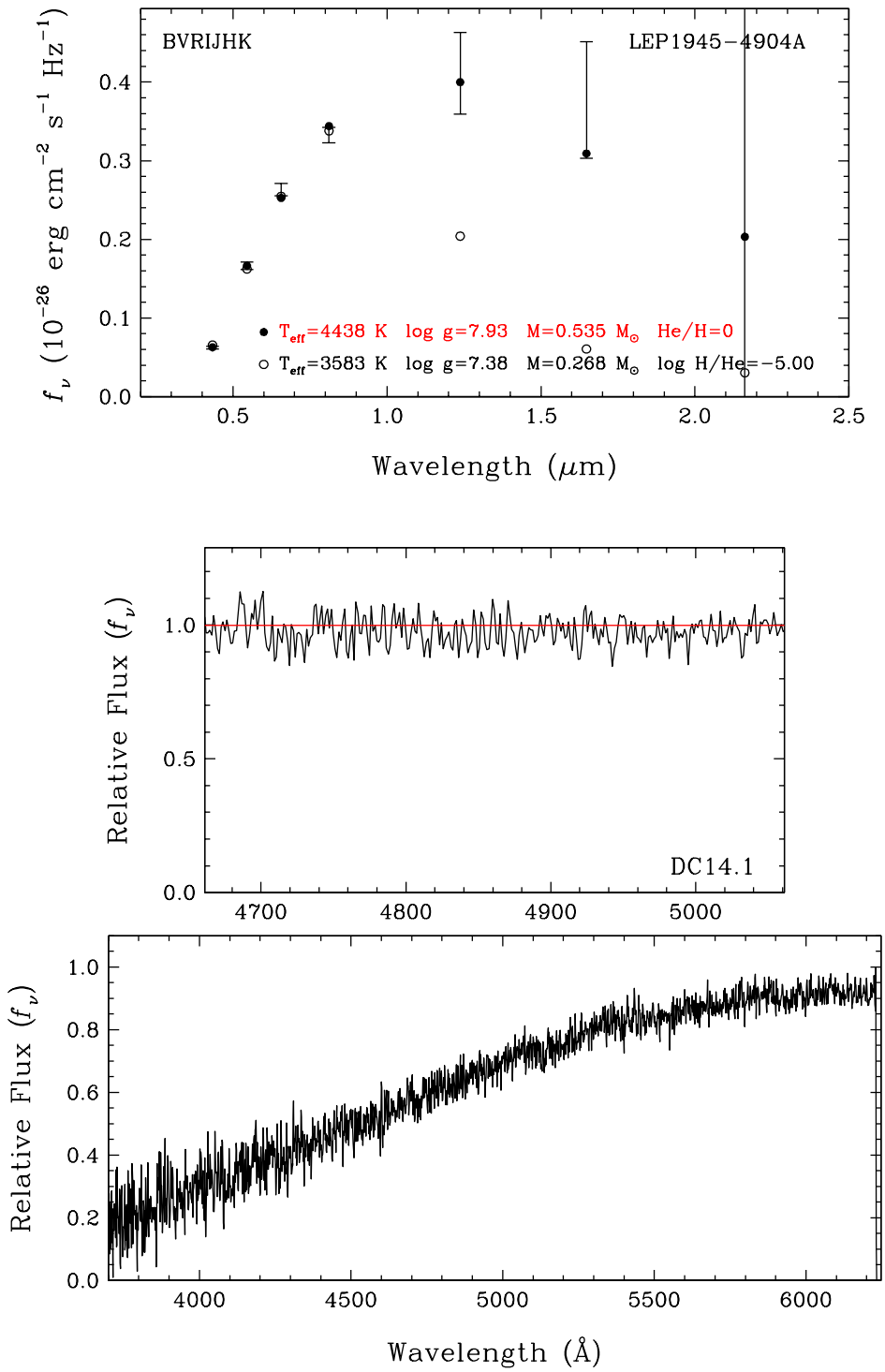

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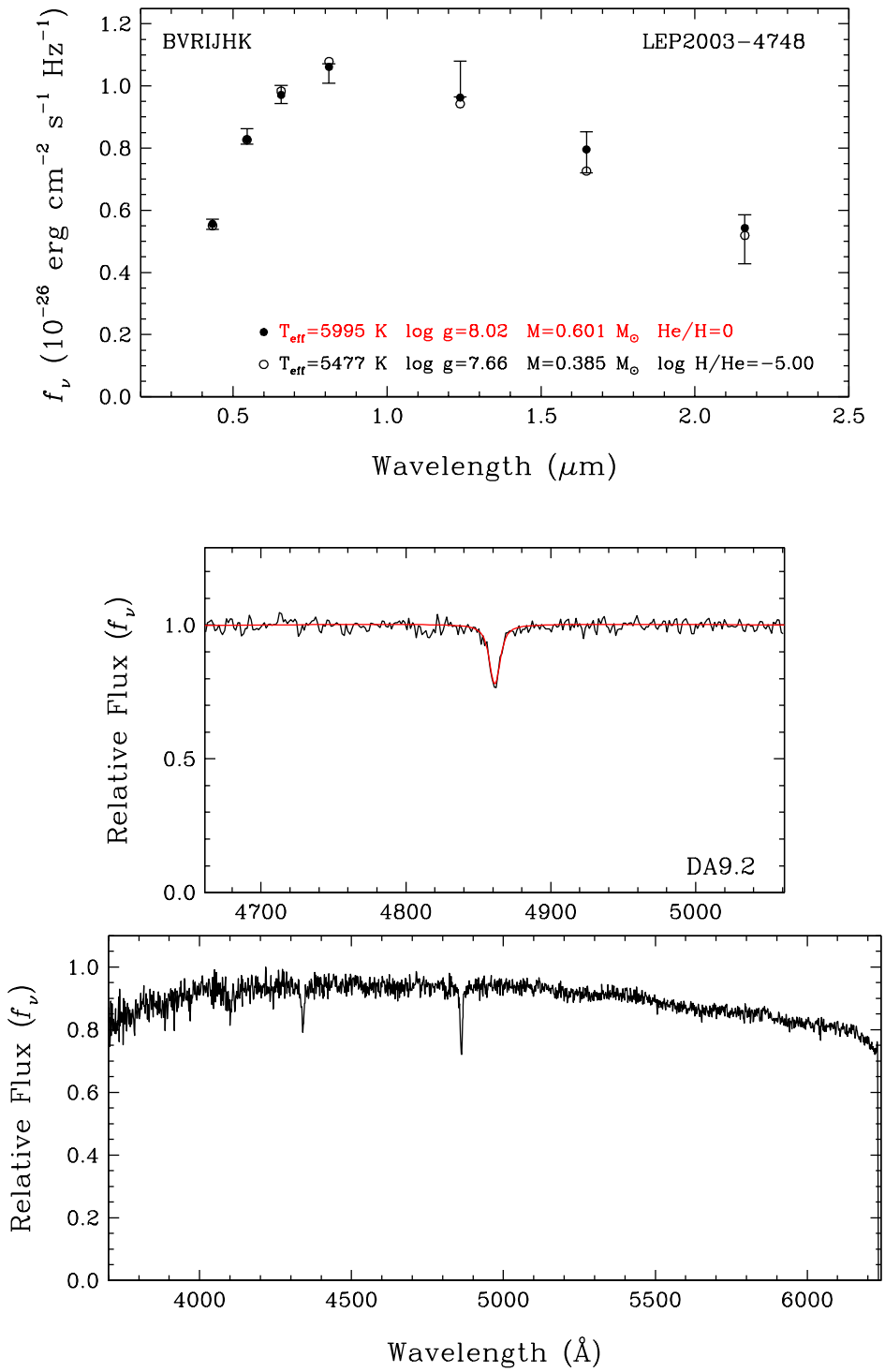

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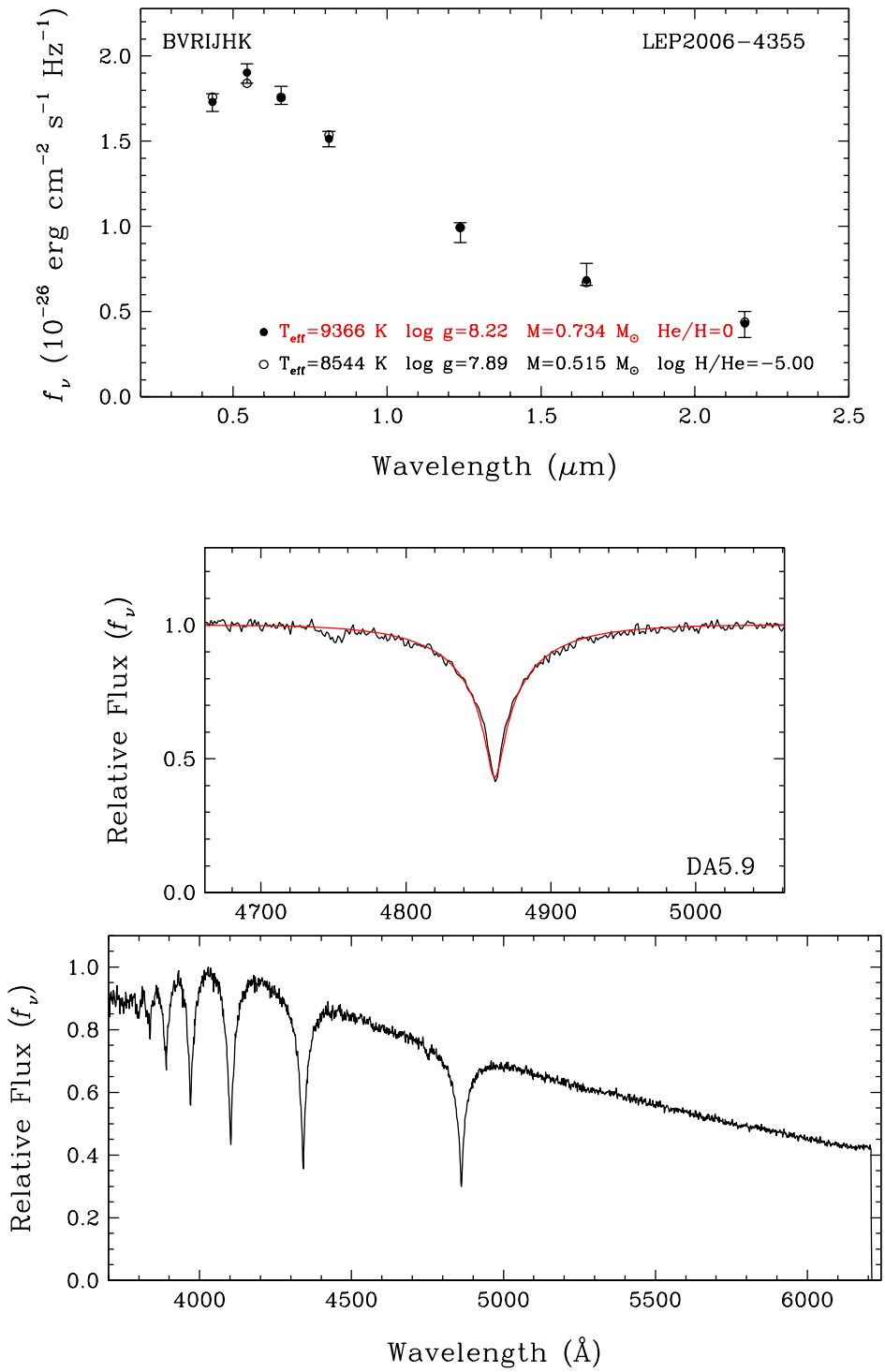

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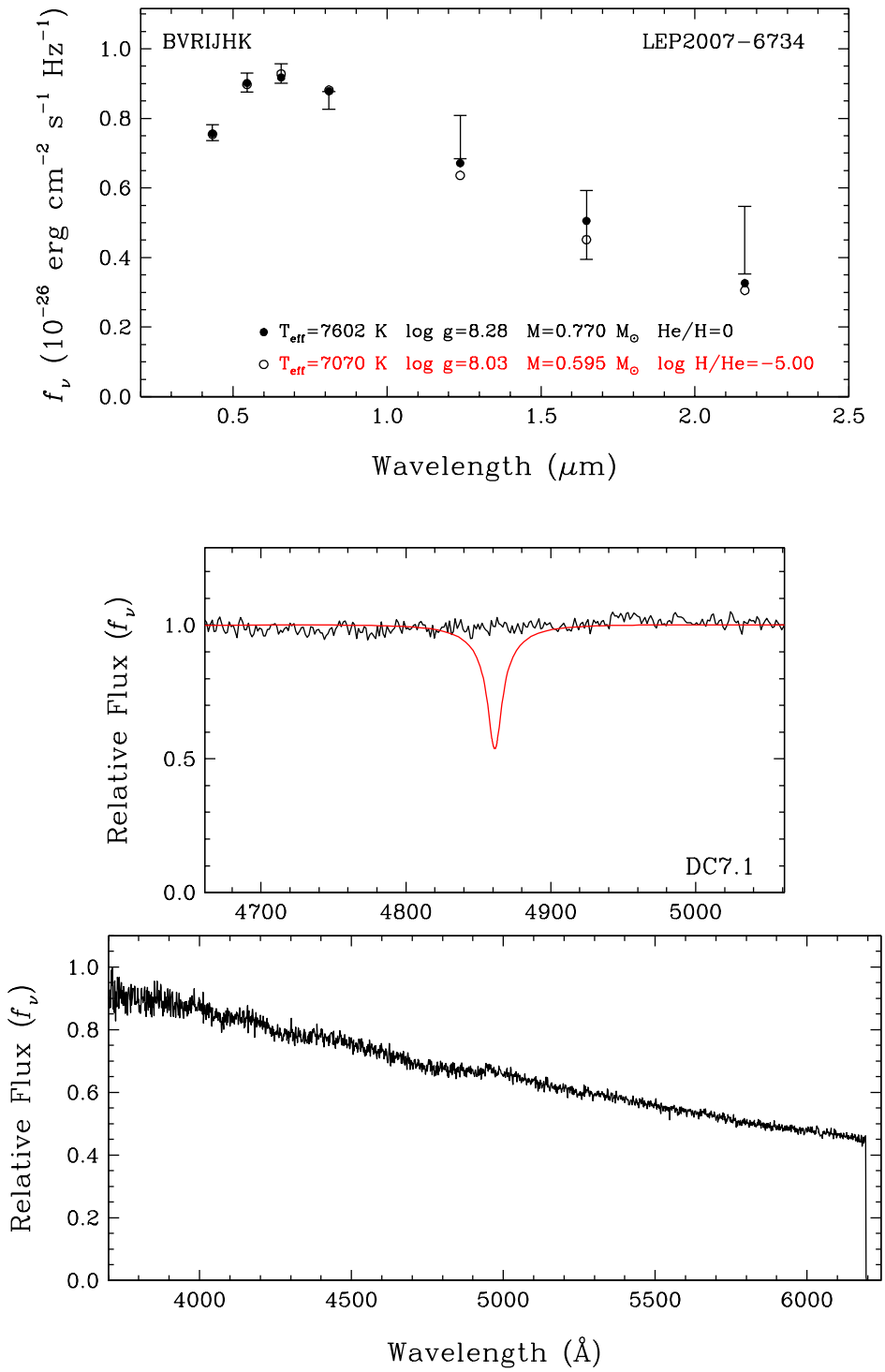

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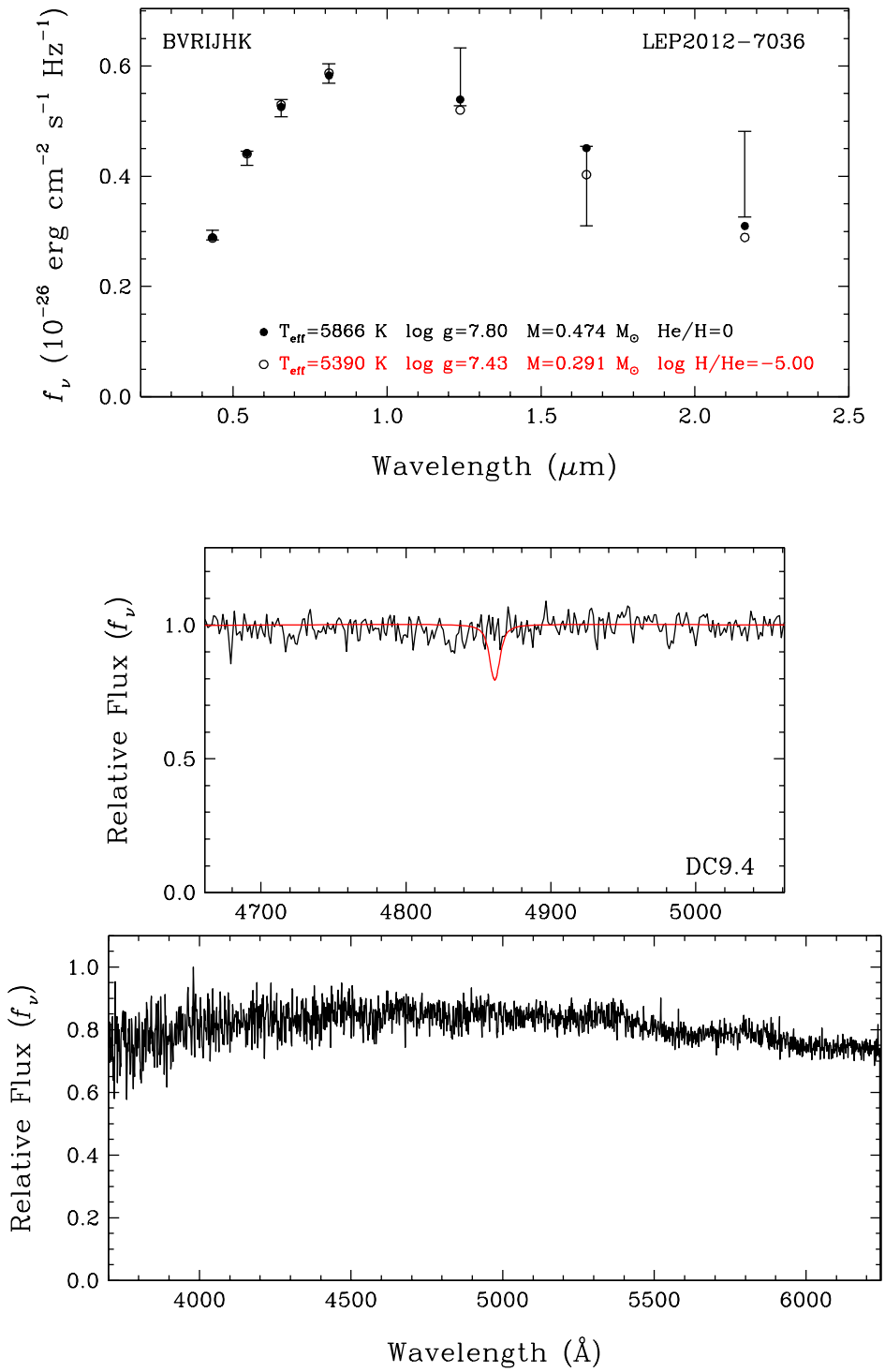

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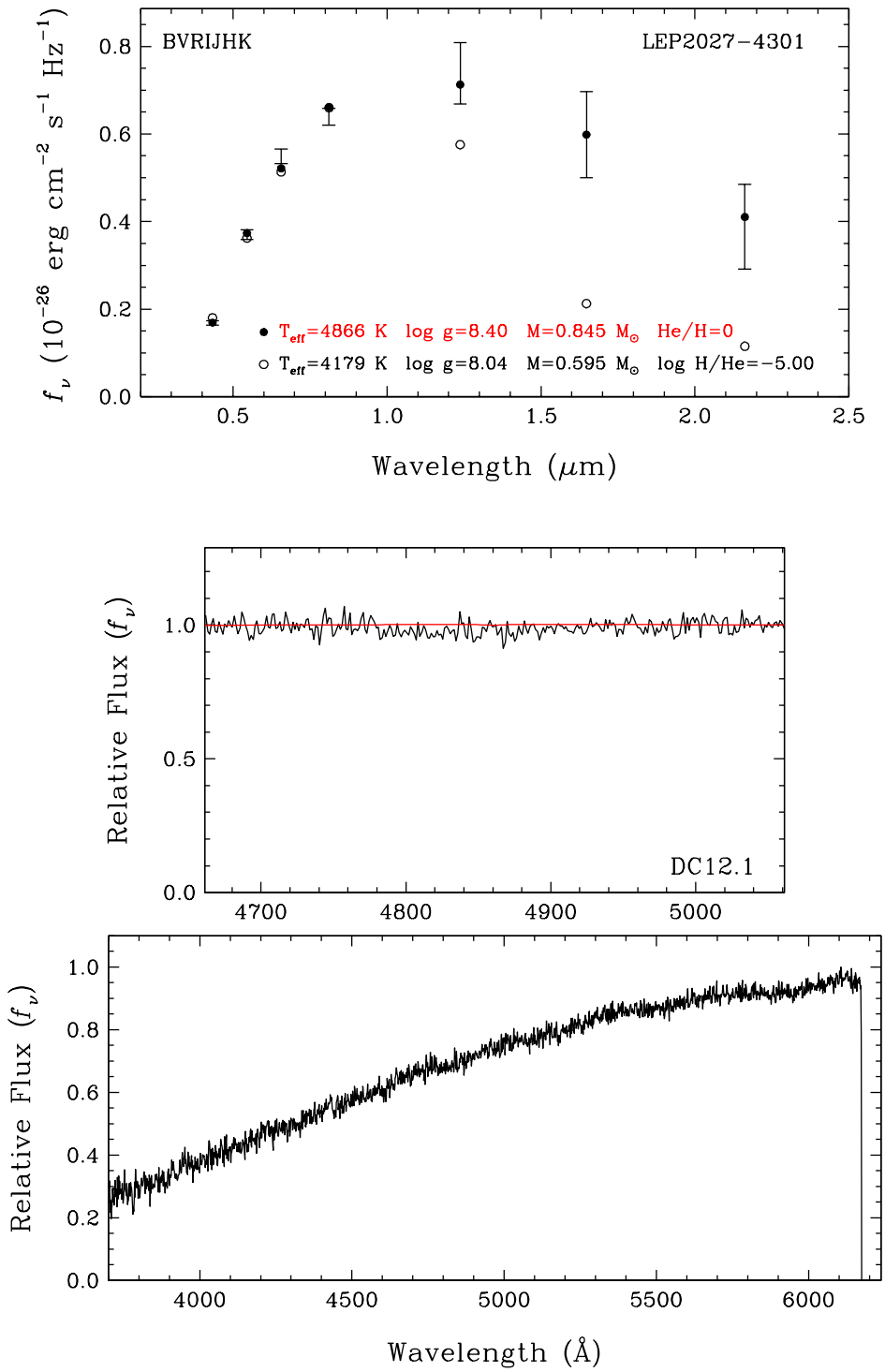

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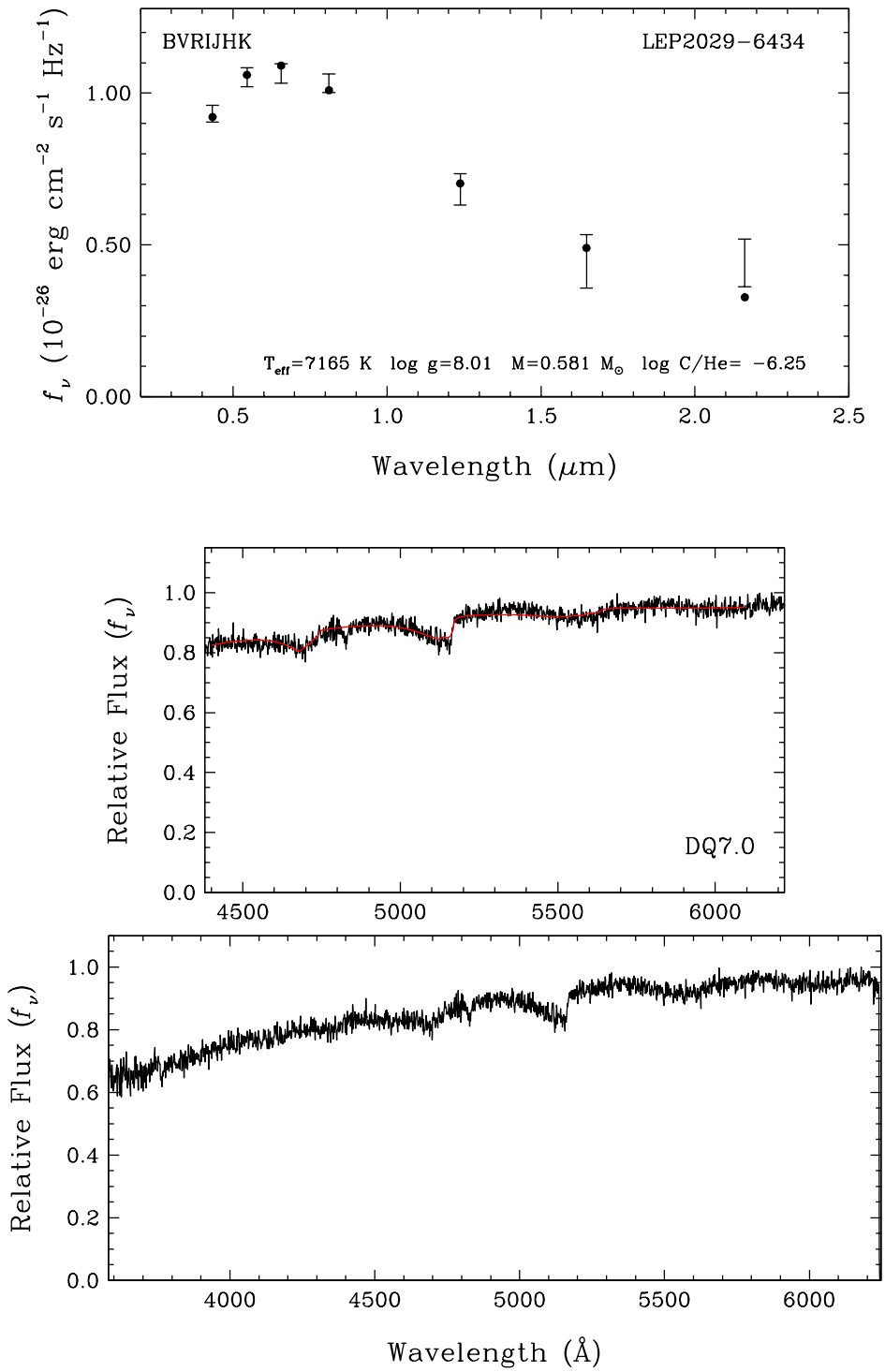


Fig. 85.— Same as Figure 2.

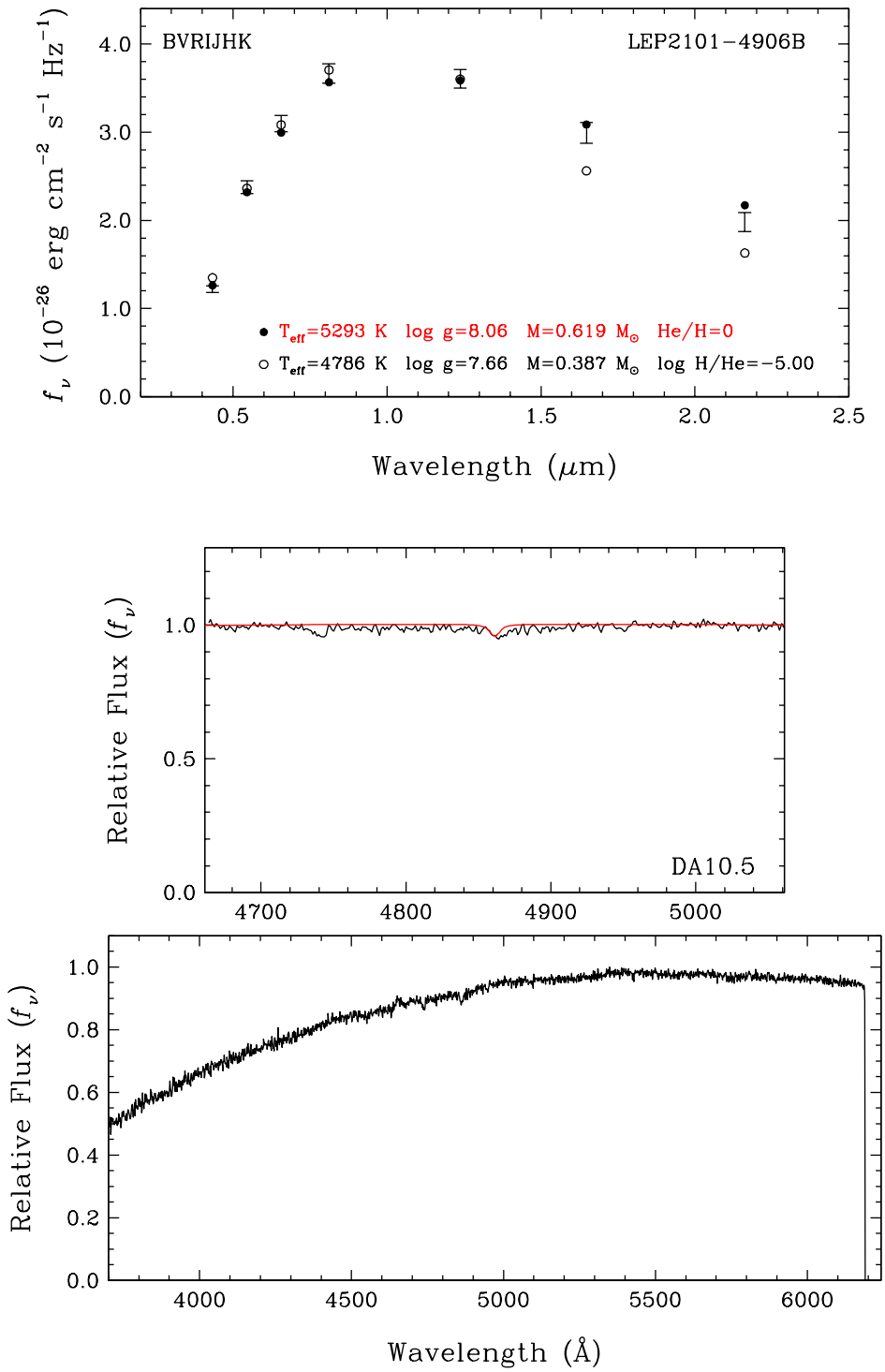


Fig. 86.— Same as Figure 2.

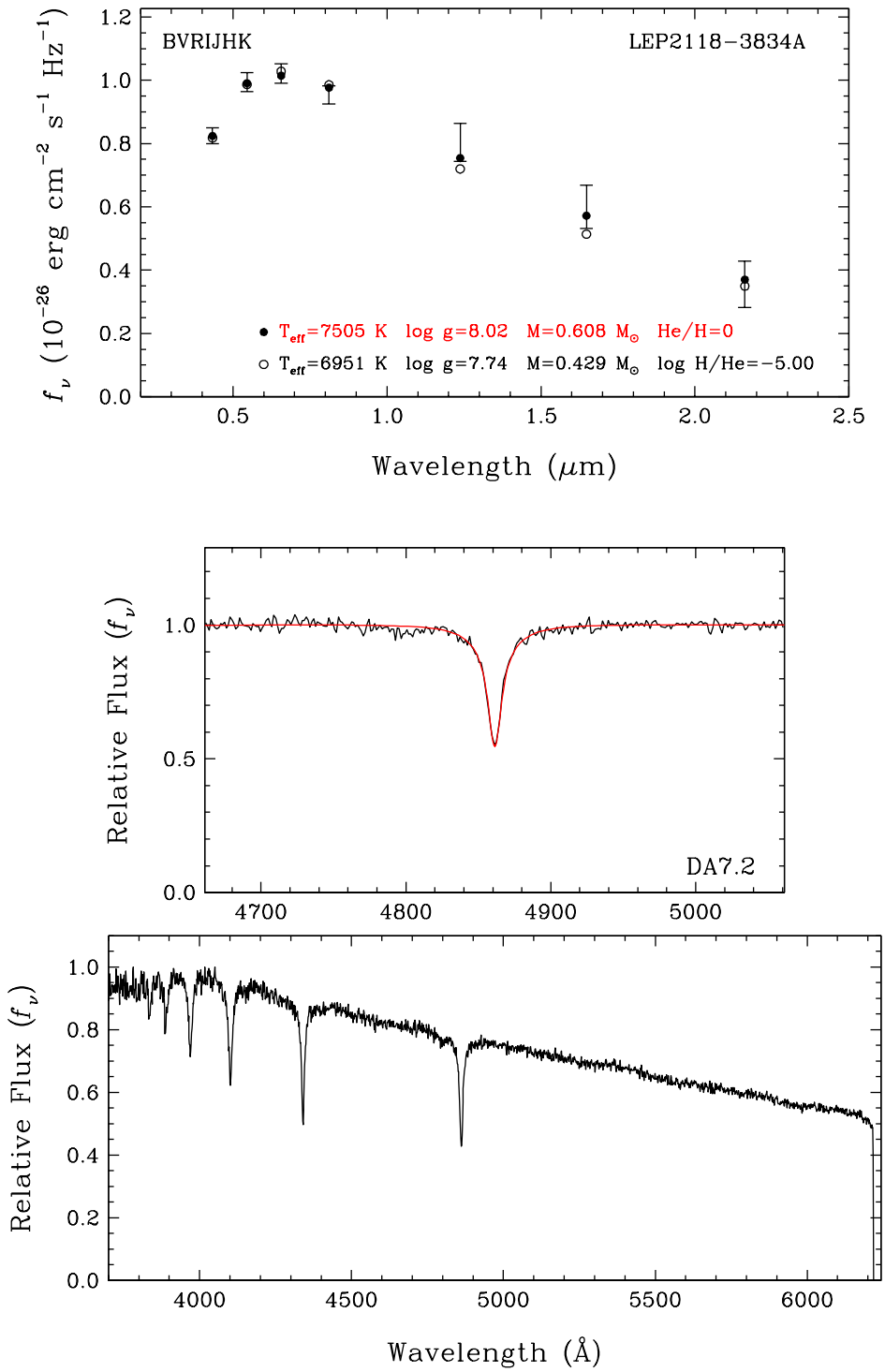


Fig. 87.— Same as Figure 2.

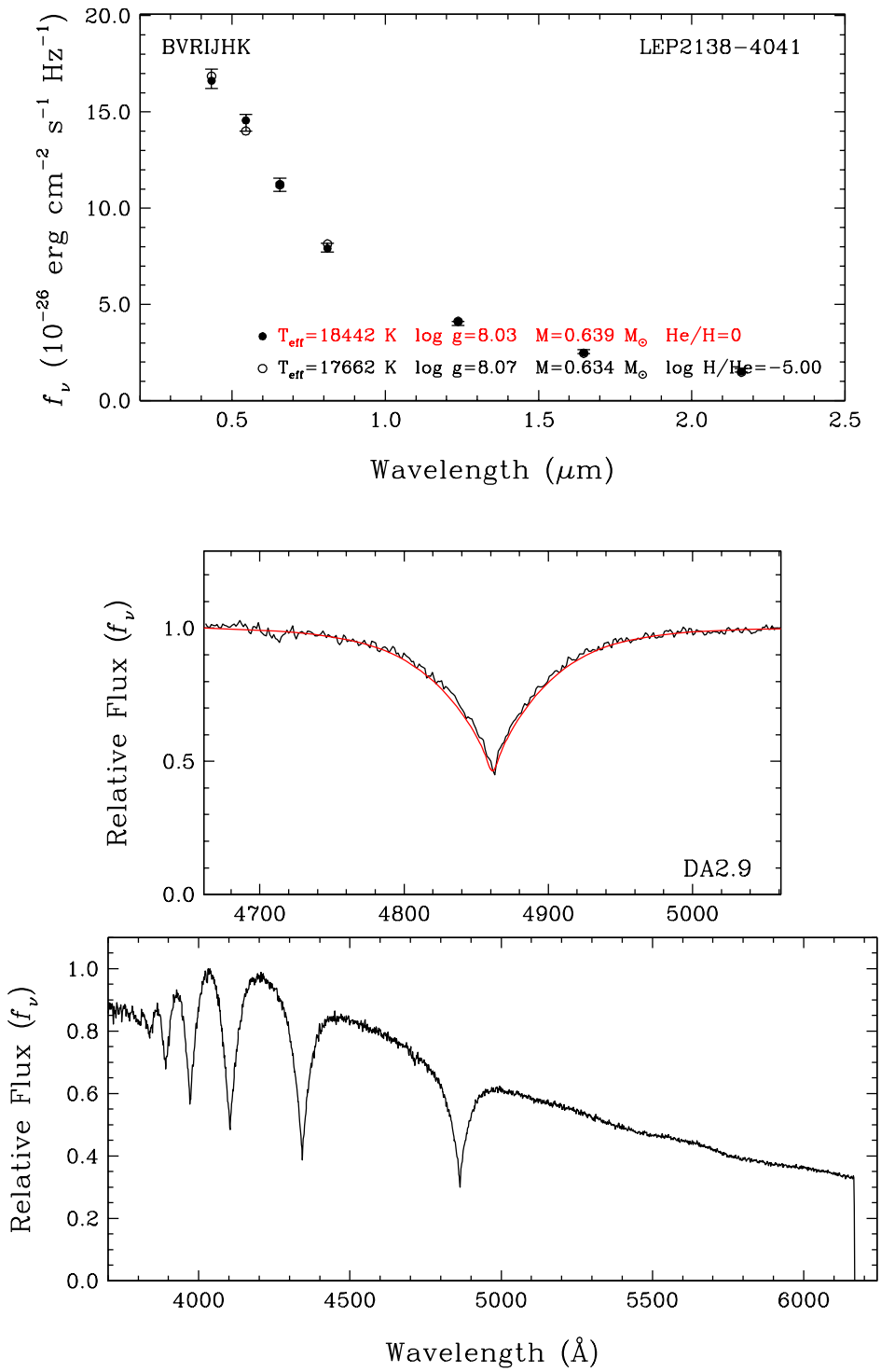


Fig. 88.— Same as Figure 2.

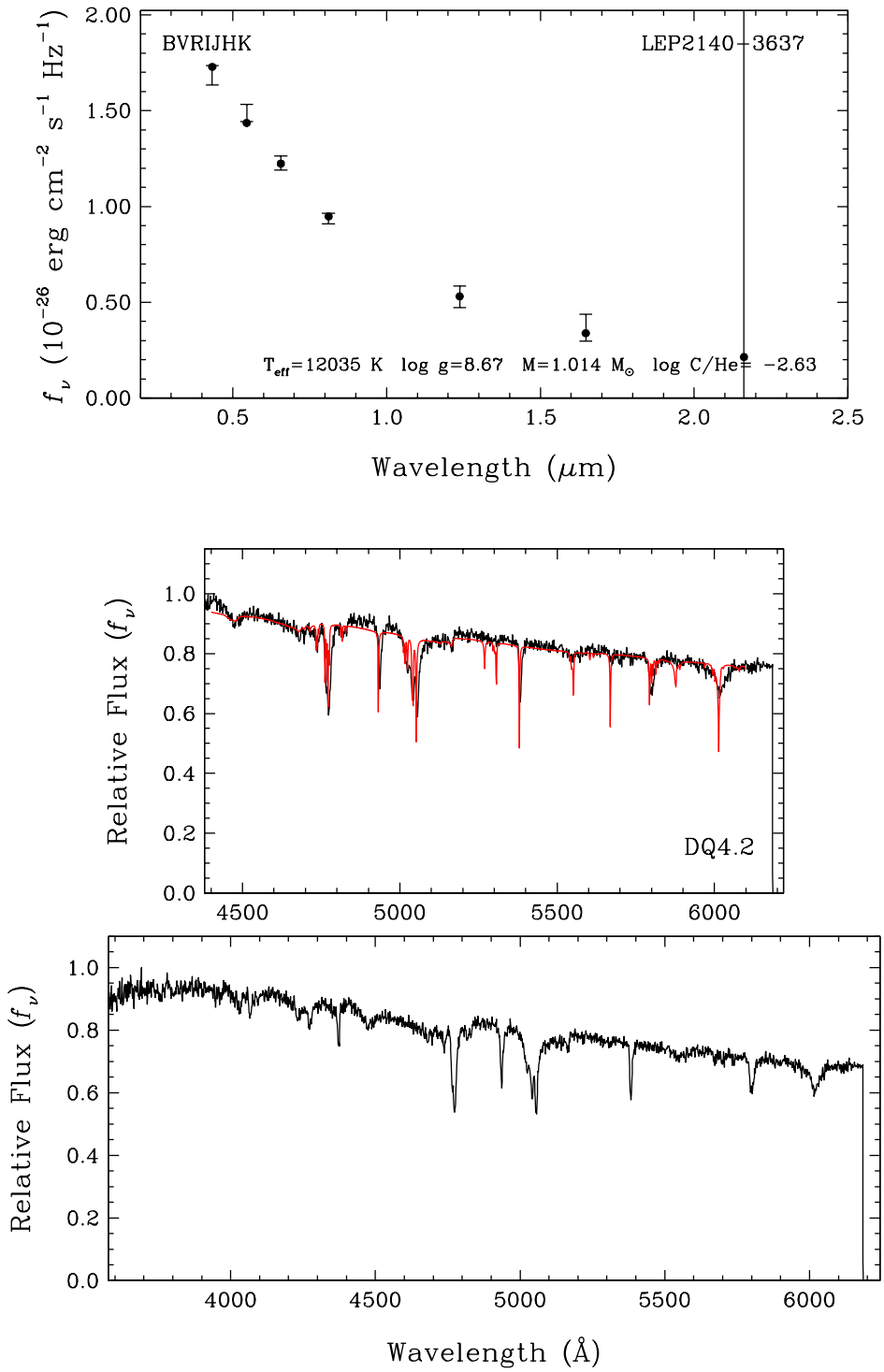


Fig. 89.— Same as Figure 2.

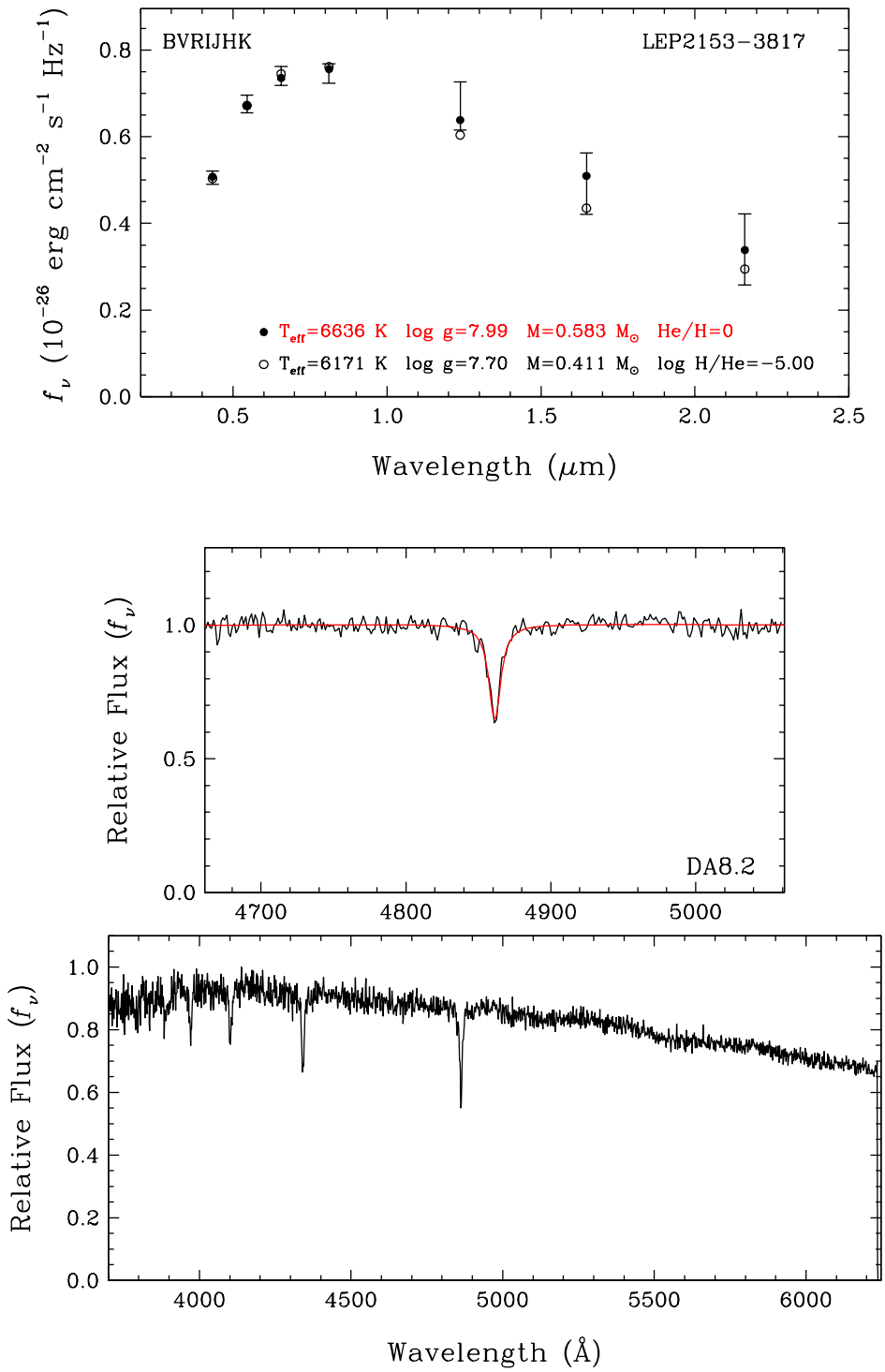


Fig. 90.— Same as Figure 2.

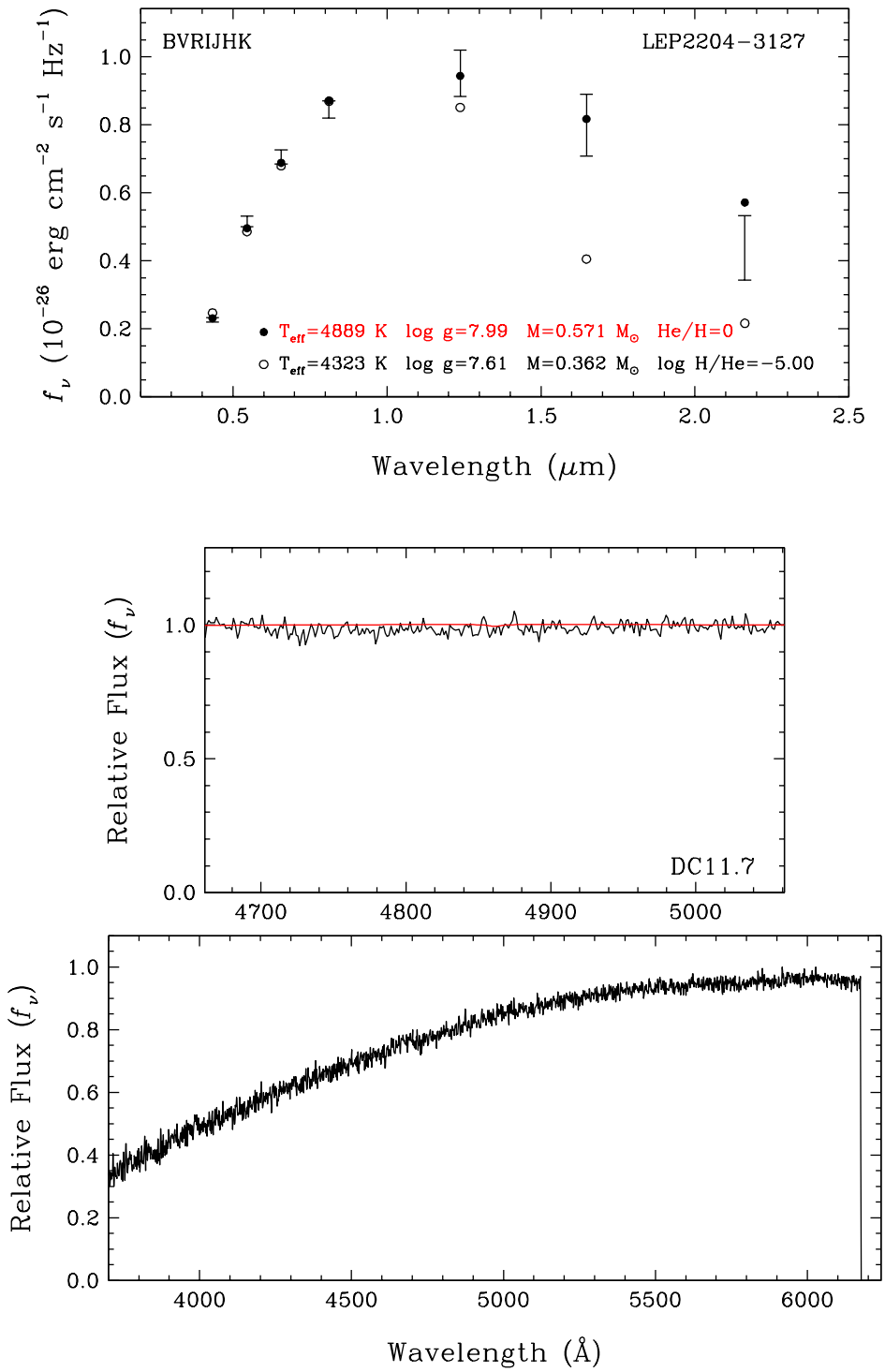


Fig. 91.— Same as Figure 2.

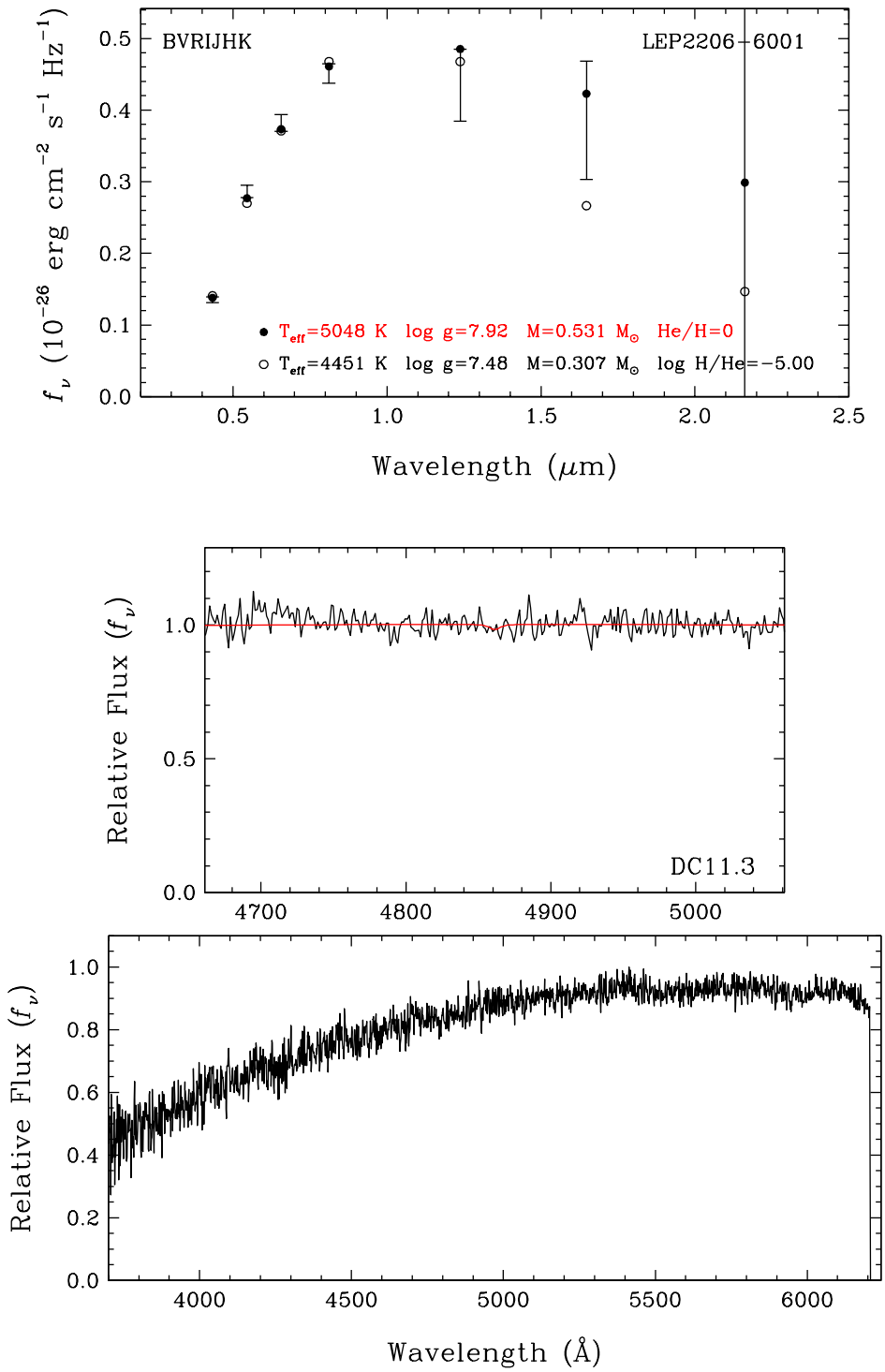


Fig. 92.— Same as Figure 2.

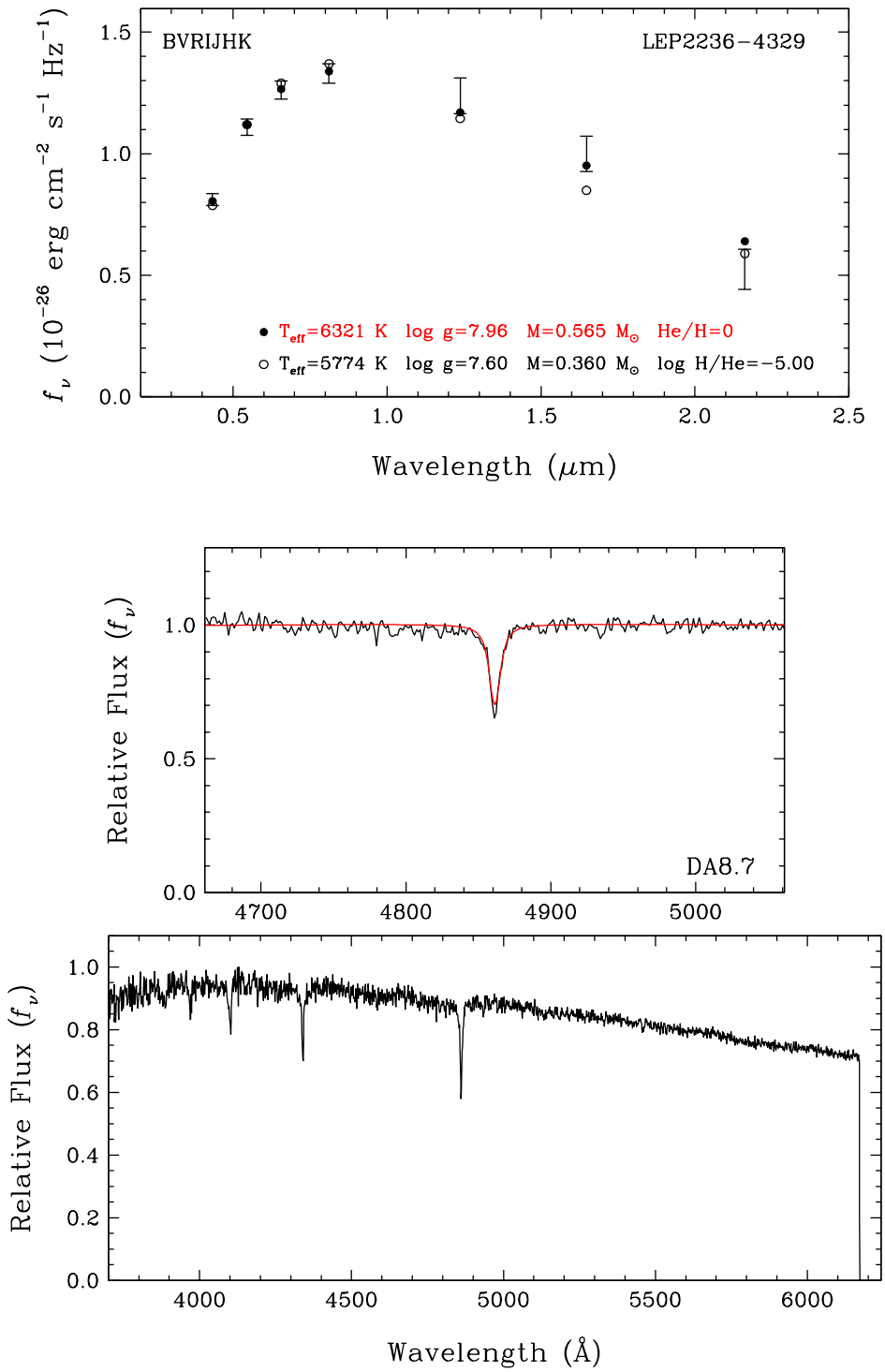


Fig. 93.— Same as Figure 2.

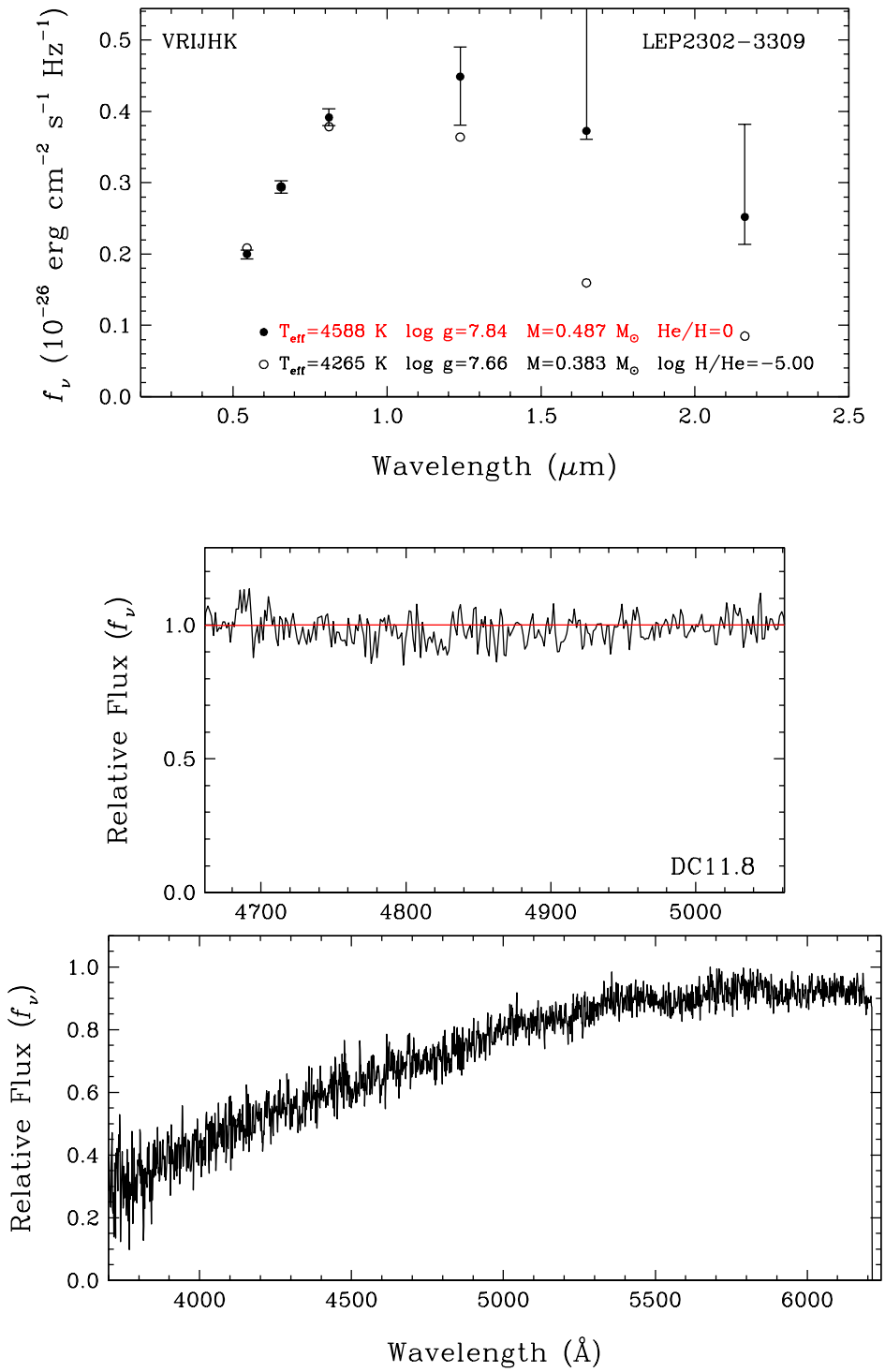


Fig. 94.— Same as Figure 2.

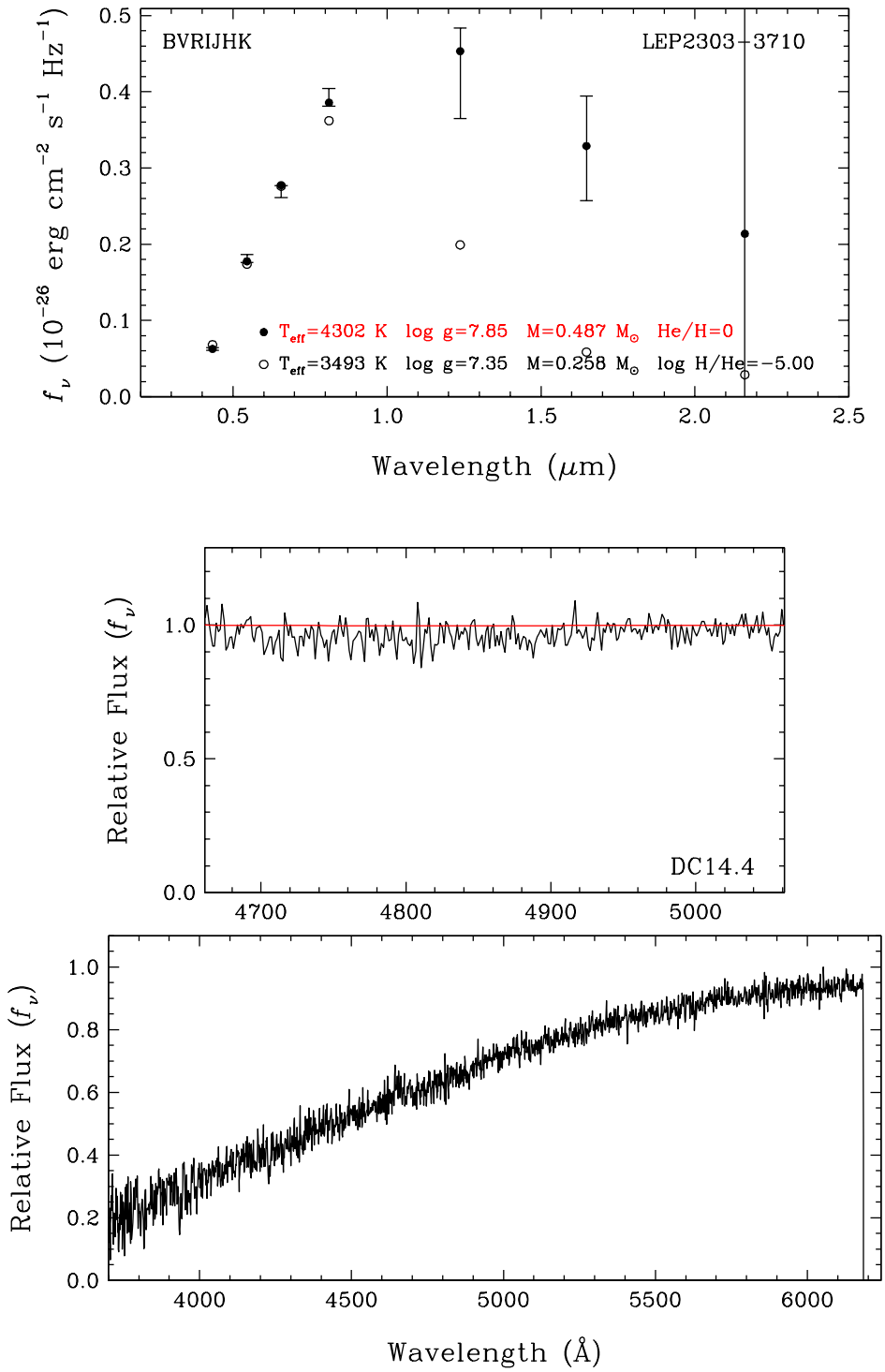


Fig. 95.— Same as Figure 2.

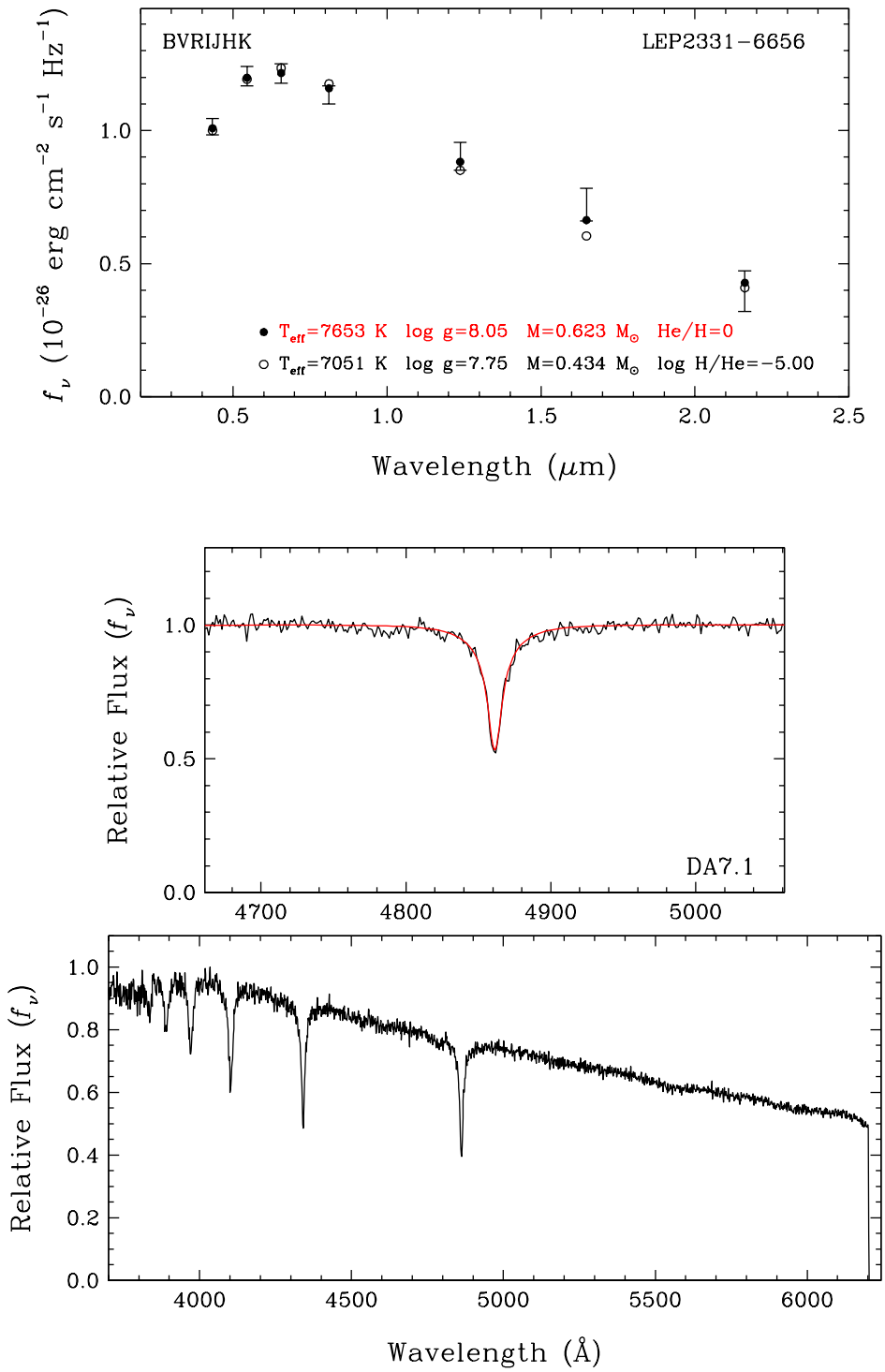
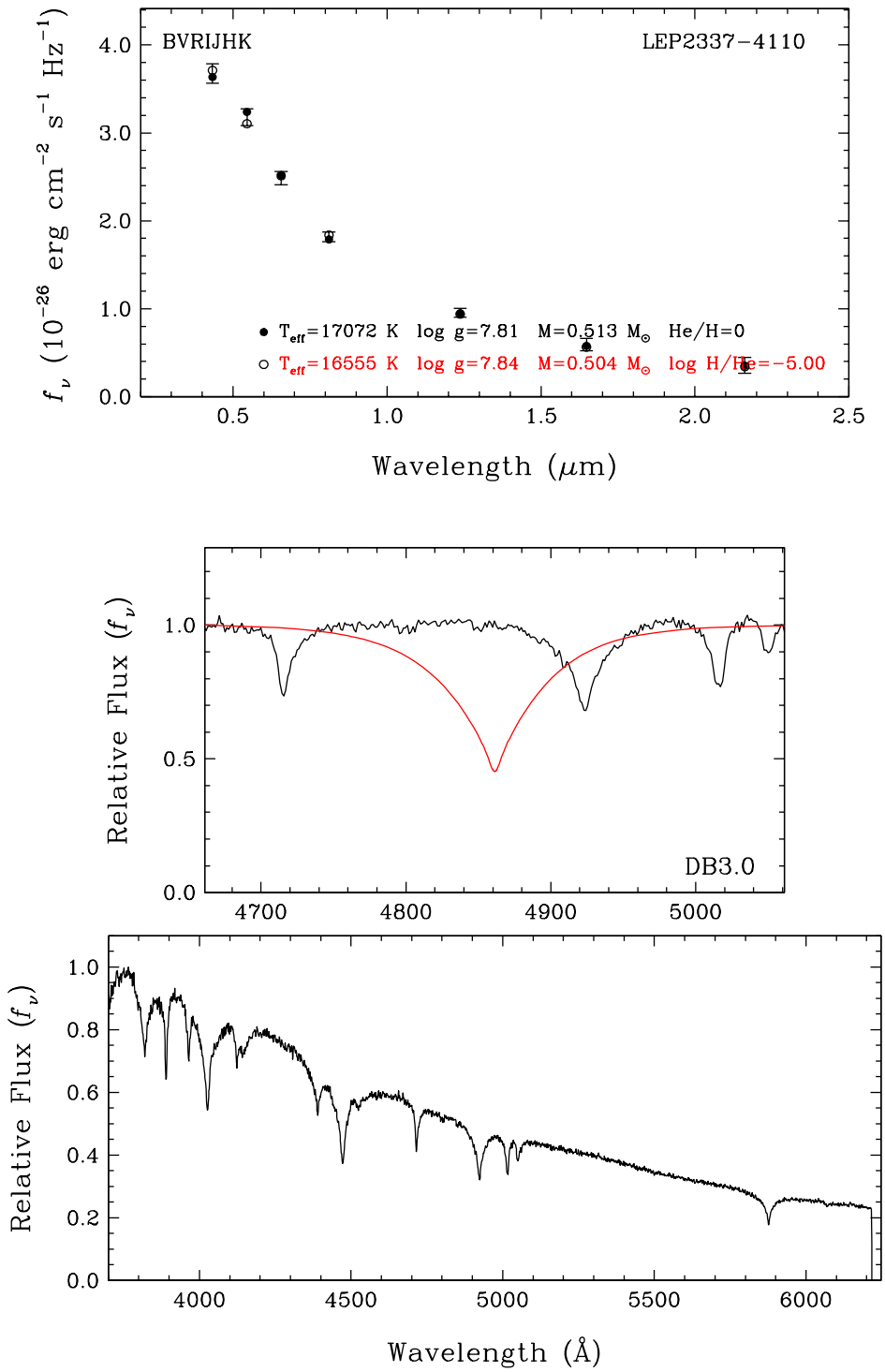


Fig. 96.— Same as Figure 2.



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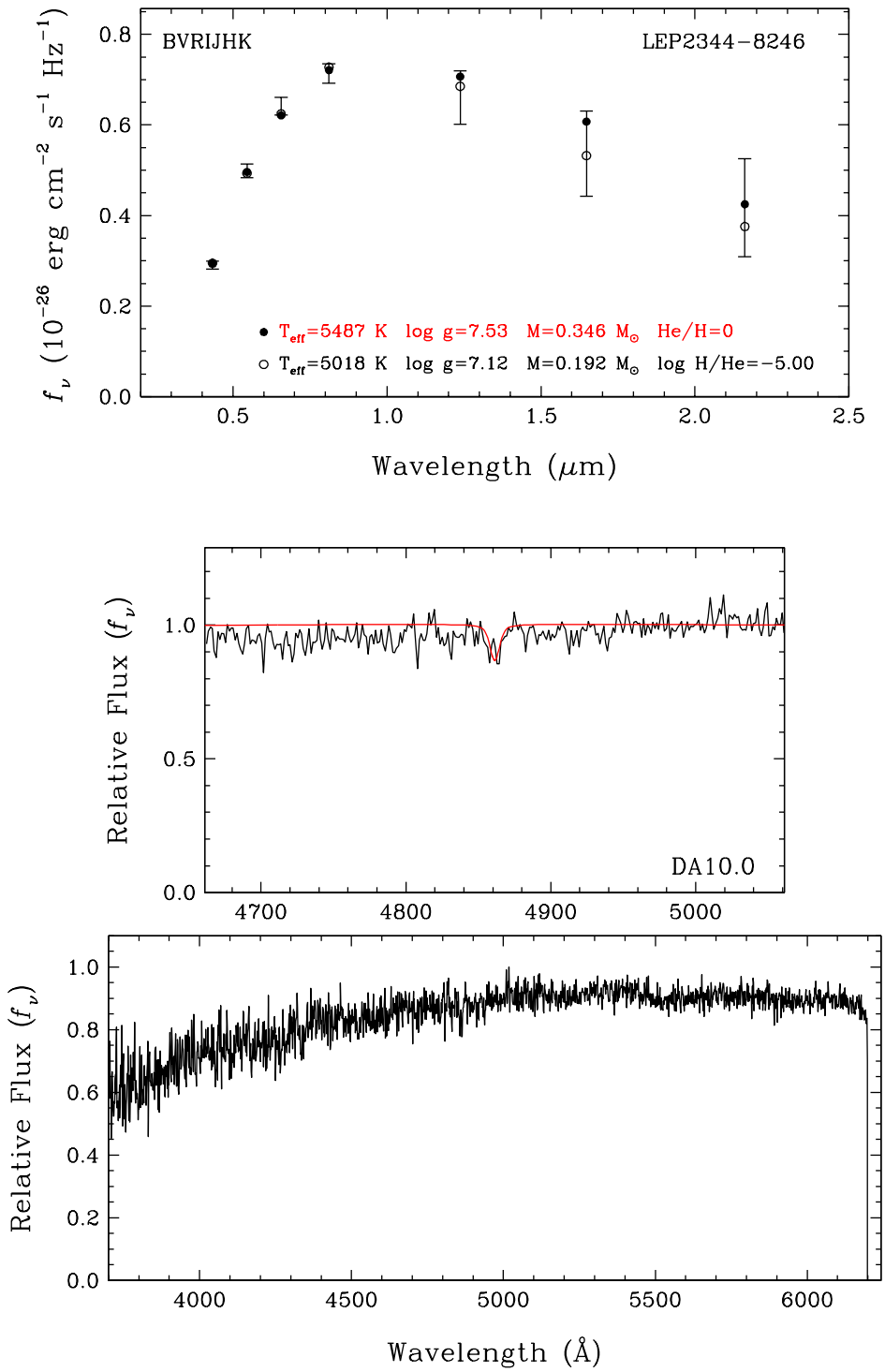

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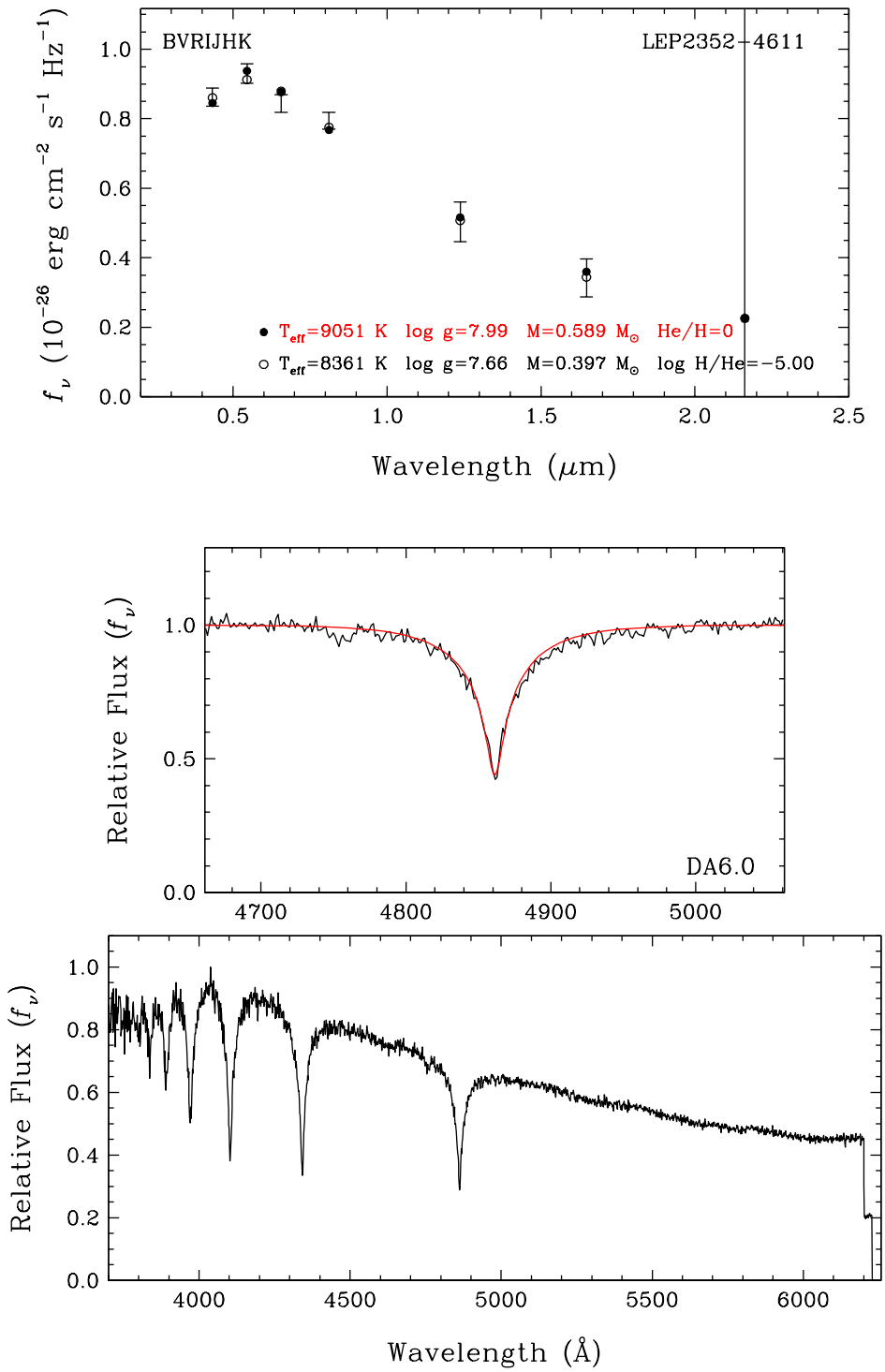

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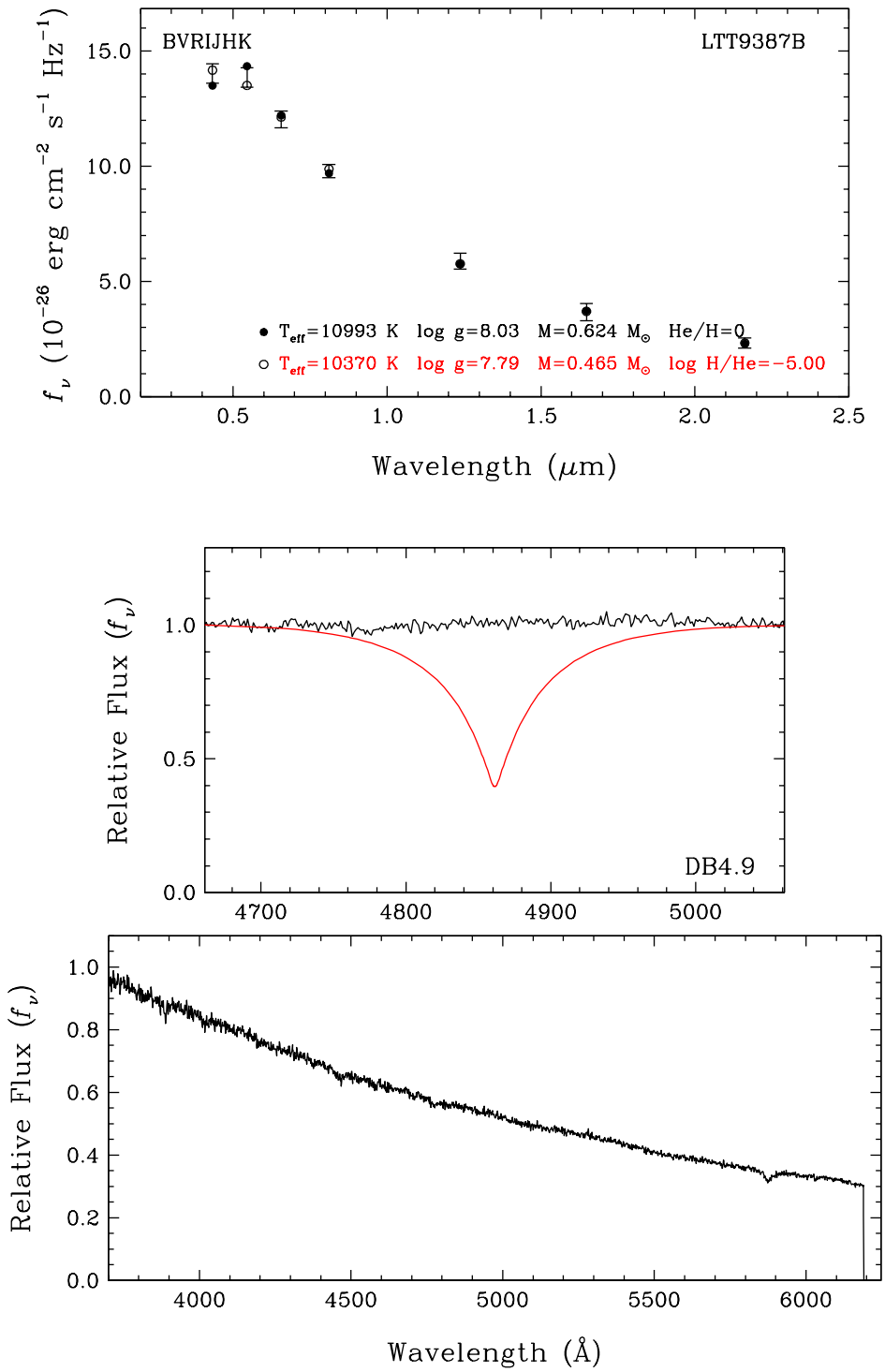

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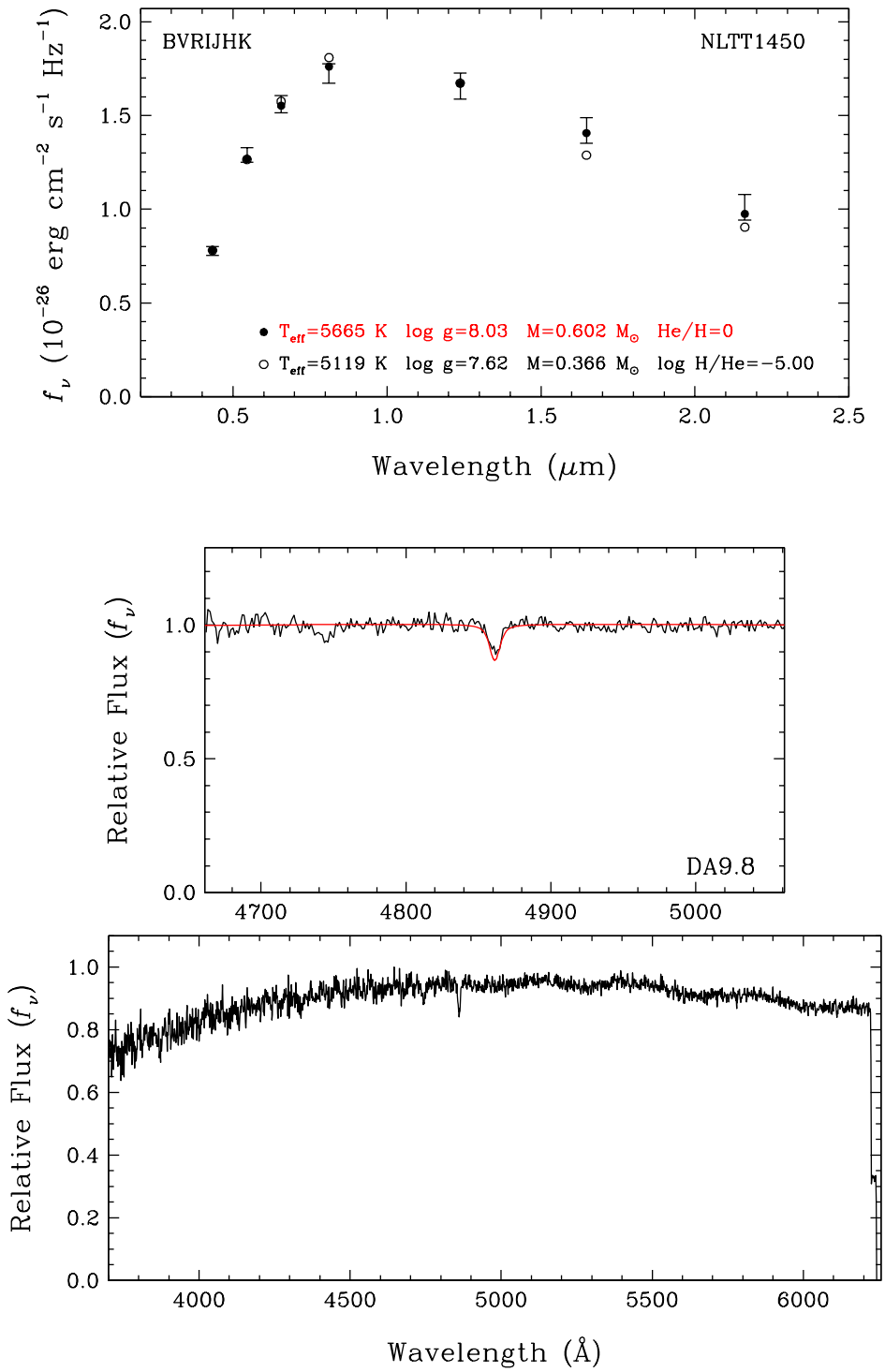

Fig. 101.— Same as Figure 2.

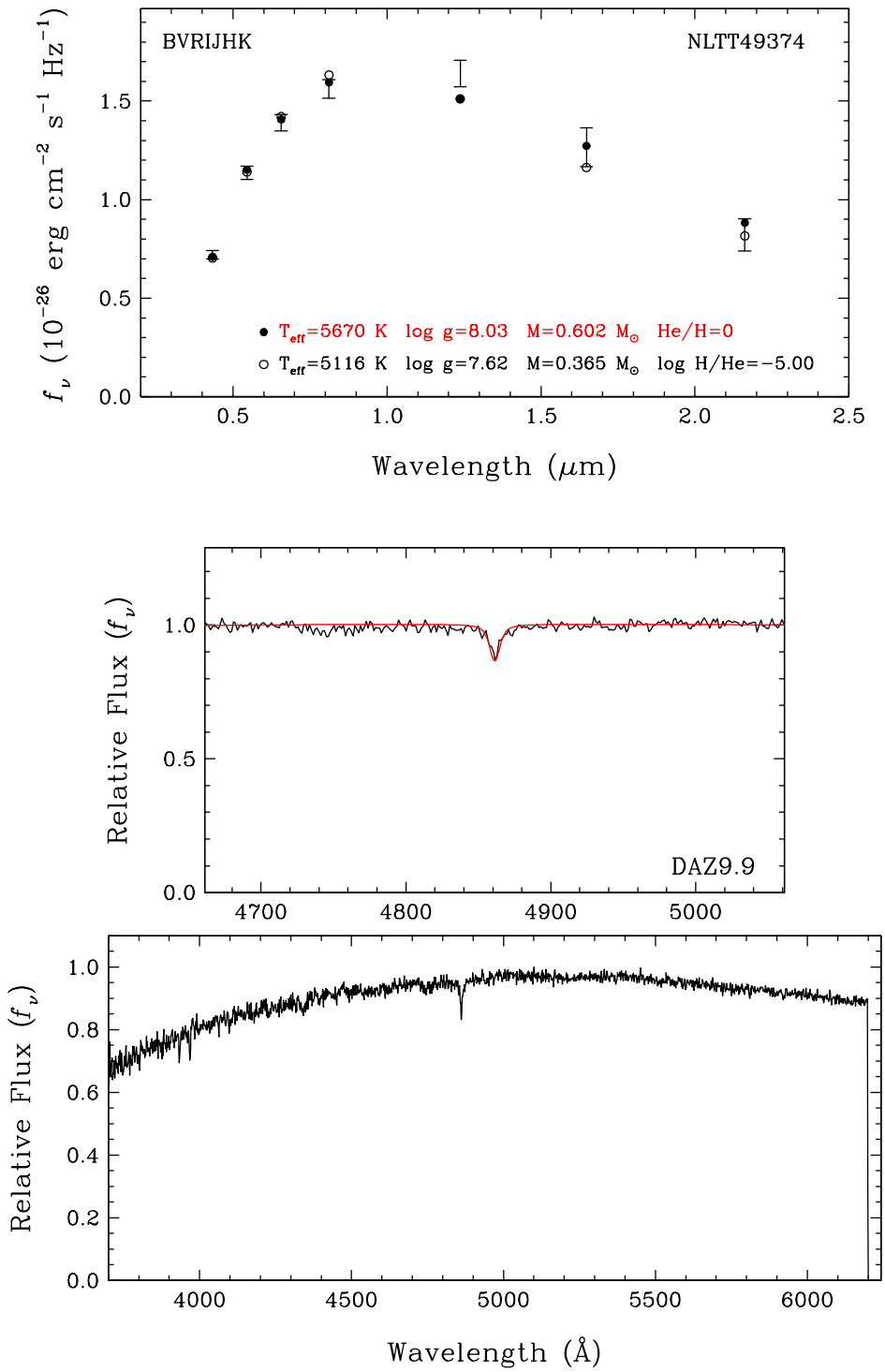

Fig. 102.— Same as Figure 2.