Tested by Miriam Cortés Contreras, on August 21th 2019.

1 Summary

We tested the XMM-OM Serendipitous Source Survey Catalogue[1] [XMM-SUSS4.1, Page et al., 2012] in VOSA. To do that, we selected "good" sources from the catalogue with counterpart in GALEX DR2 AIS (All-sky Imaging Survey) [Bianchi et al., 2011]. On one hand, we compared the observed fluxes in XMM filters with the theoretical fluxes predicted by the model, aiming at proving their good fitting to the theoretical SED. On the other hand, we compared the observed fluxes in XMM filters with fluxes in similar filters in the ultraviolet and the optical wavelenght range.

2 Methodology

- From the XMM-SUSS4.1 Catalogue with 8 176 156 sources, we selected sources without quality flag, classified as point-like and with magnitude errors under 0.2 mag:

  ```
  q.UVW2=="FFFFFFFFFFFF" && q.uVM2=="FFFFFFFFFFFF" && q.UVW1=="FFFFFFFFFFFF"
  && q.U=="FFFFFFFFFFFF" && q.B=="FFFFFFFFFFFF" && q.V=="FFFFFFFFFFFF"
  && xUVW2==0 && xUVM2==0 && xUVW1==0 && xU==0 && xB==0 && xV=0
  && e_UVW2mAB<=0.2 && e_UVM2mAB<=0.2 && e_UVW1mAB<=0.2 && e_UmAB<=0.2
  && e_BmAB<=0.2 && e_VmAB<=0.2
  ```

  862 sources remain.

- We cross-matched this sample within 1 arcsec by using the CDS-Xmatch with GALEX DR2 AIS. We obtained 207 matches.

- We uploaded these sources' coordinates to VOSA and gathered VO photometry from 2MASS, DENIS, WISE, CMC14, APASS9, Gaia DR2, Pan-Starrs PS1, XMM-SUSS4.1, GALEX, VHS DR3, VIDEO DR4, Dark Energy Survey SVA1 Gold, SDSS DR9, UKIDSS LAS DR10, UKIDSS Ultra Deep Survet DR10 and VIKING DR4. No distances were found for these targets.

[1] `http://cdsarc.u-strasbg.fr/viz-bin/Cat?II/356`

- We performed a chi-square fit using BT-Settle models without any parameter restriction. For 172 sources we obtained good SED fitting ($V_{gfb} < 15$).
- We compare their observed fluxes in the following section.

3 Flux comparison

3.1 Observed vs. Model

We compared the observed fluxes in each of the five bands of XMM-SUSS4.1 with the theoretical fluxes predicted by the model in Figures 1 and 2.

3.2 XMM vs. GALEX

We compared the UVM2 band with the NUV filter of GALEX. Figure 3 shows the normalized transmission curves of the filters, the comparison between observed fluxes and the distribution of the flux ratio.

In the optical, we compared the B and V bands with the B and V filters of APASS. Figures 4 and 5 show the normalized transmission curves of the filters, the comparison between observed fluxes and the distribution of the flux ratio.

4 Conclusions

In the ultraviolet the differences between observed and modeled fluxes are larger than in the optical (see Table 1).

Regarding the flux comparison with other filters, fluxes in the UVM2 band are systematically higher when comparing UVM2 with NUV. In the optical, the comparison between the B and V bands of XMM and APASS show very good agreement. (see Table 2).

An example of a SED fitted with BT-Settl using these bands is shown in Figure 6.

Table 1: XMM flux comparison: observed vs. modeled.

Filter	F_{Obs}/F_{Mod}		
	Median	Q10	Q90
UVW2	1.32	0.97	2.13
UVM2	1.23	0.98	1.52
UVW1	1.04	0.97	1.18
U	1.00	0.95	1.06
B	0.94	0.89	0.99
V	1.03	0.97	1.08

Table 2: Flux comparison: XMM vs. GALEX and APASS.

Filter	F_{Obs}/F_{Mod}		
	Median	Q10	Q90
UVM2/NUV	1.15	0.91	1.38
B_{XMM}/B_{APASS}	0.97	0.90	1.06
V_{XMM}/V_{APASS}	1.03	0.95	1.10

References

L. Bianchi, J. Herald, B. Efremova, L. Girardi, A. Zabot, P. Marigo, A. Conti, and B. Shiao. GALEX catalogs of UV sources: statistical properties and sample science applications: hot white dwarfs in the Milky Way. , 335(1): 161–169, Sep 2011. doi: 10.1007/s10509-010-0581-x.

M. J. Page, C. Brindle, A. Talavera, M. Still, S. R. Rosen, V. N. Yershov, H. Ziaeepour, K. O. Mason, M. S. Cropper, A. A. Breeveld, N. Loiseau, R. Mignani, A. Smith, and P. Murdin. The XMM-Newton serendipitous ultraviolet source survey catalogue. , 426(2):903–926, Oct 2012. doi: 10.1111/j.1365-2966.2012.21706.x.

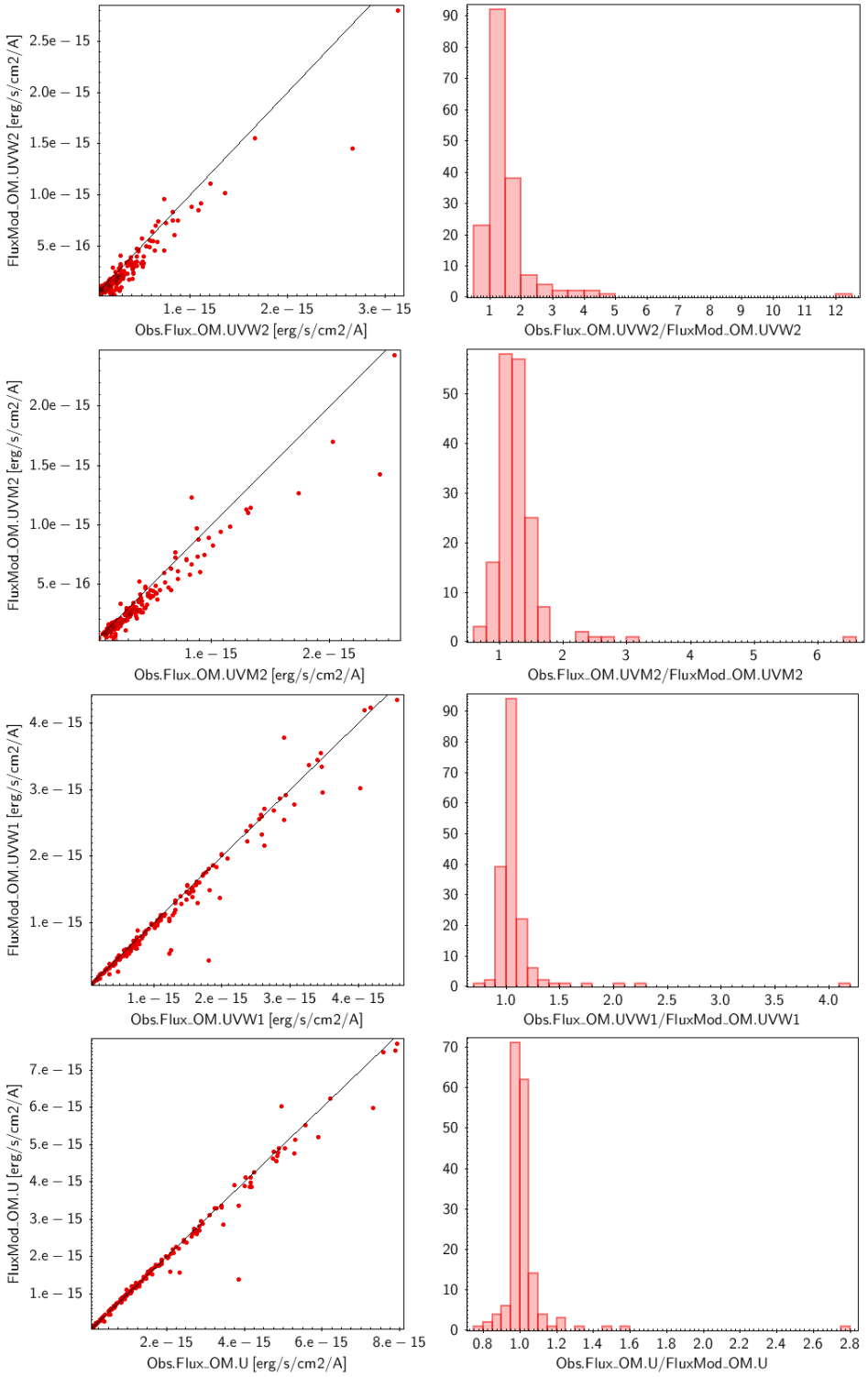

Figure 1: Comparison of observed and theoretical fluxes.

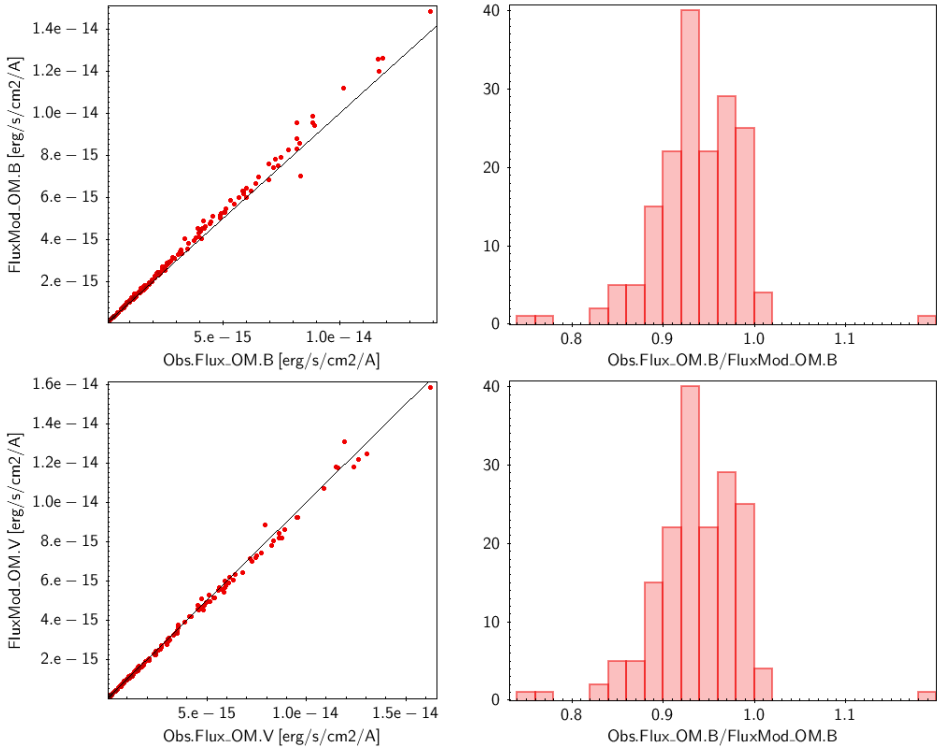

Figure 2: Comparison of observed and theoretical fluxes.

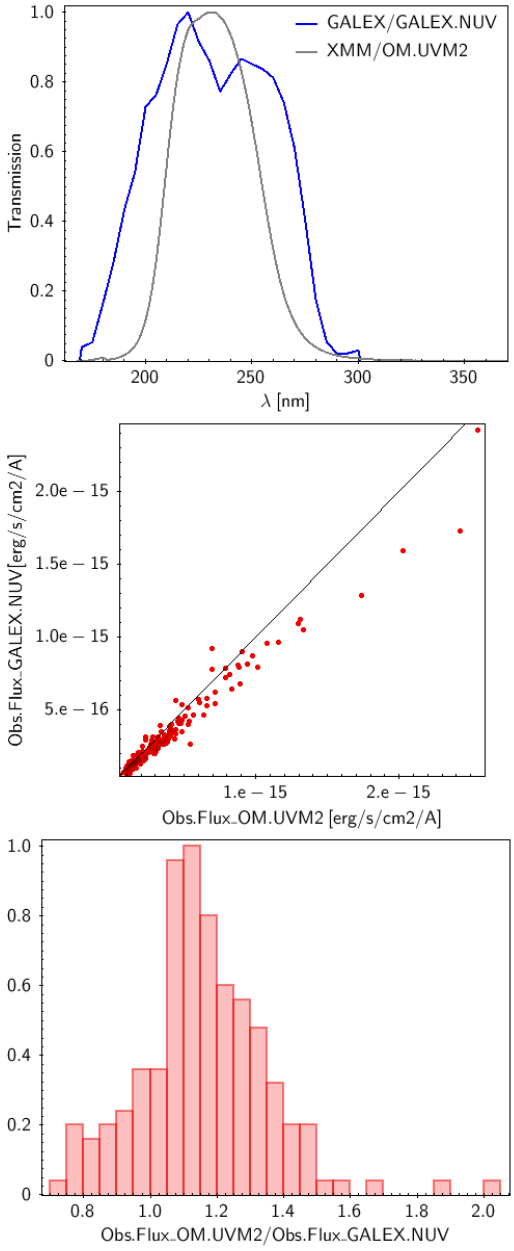

Figure 3: Comparison of filters and fluxes in the ultraviolet.

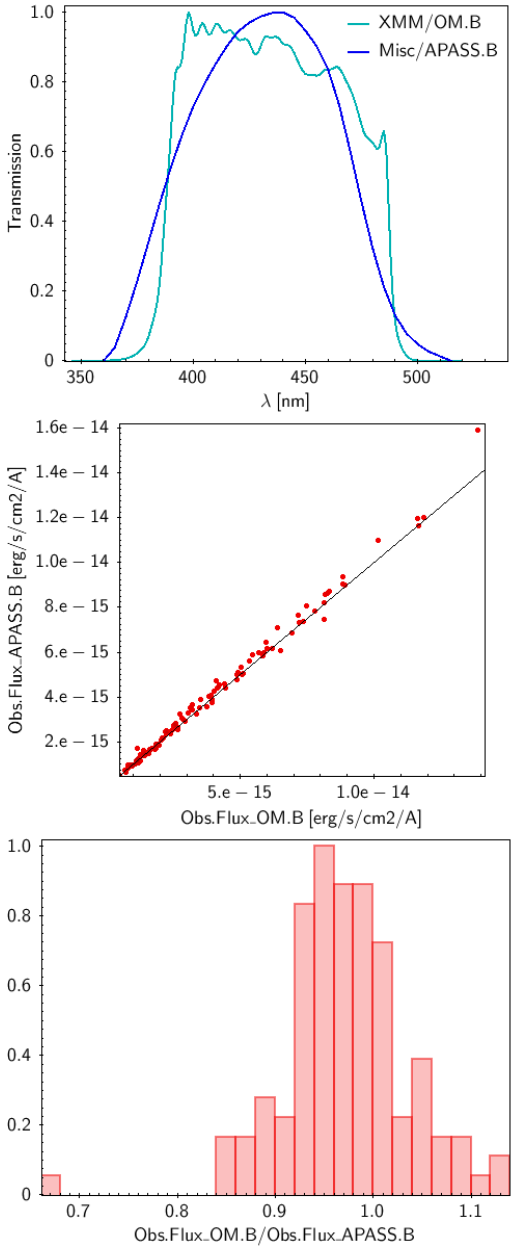

Figure 4: Comparison of filters and fluxes in the B band.

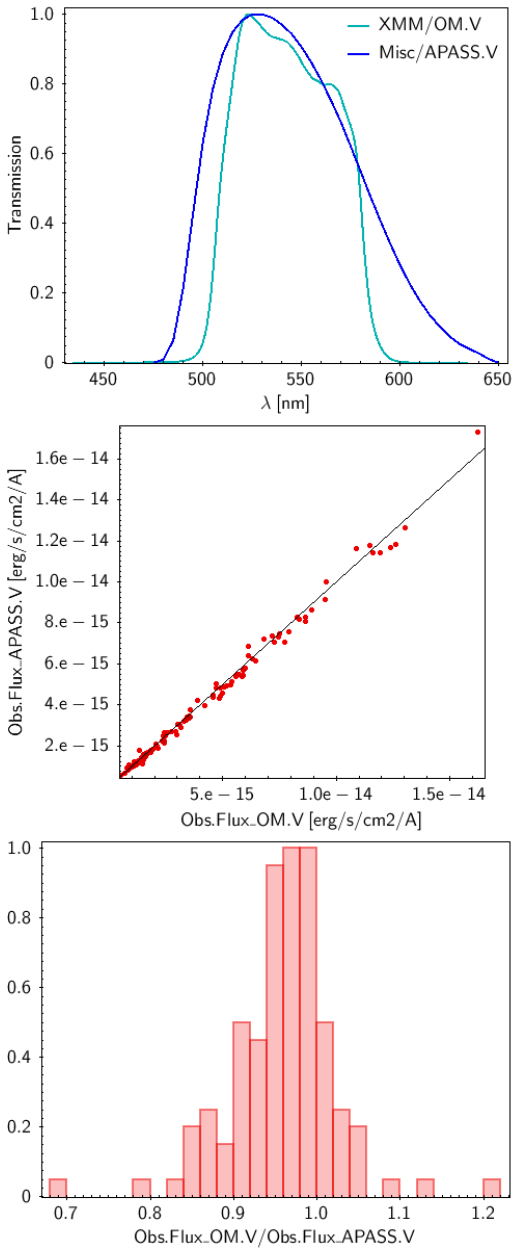

Figure 5: Comparison of filters and fluxes in the V band.

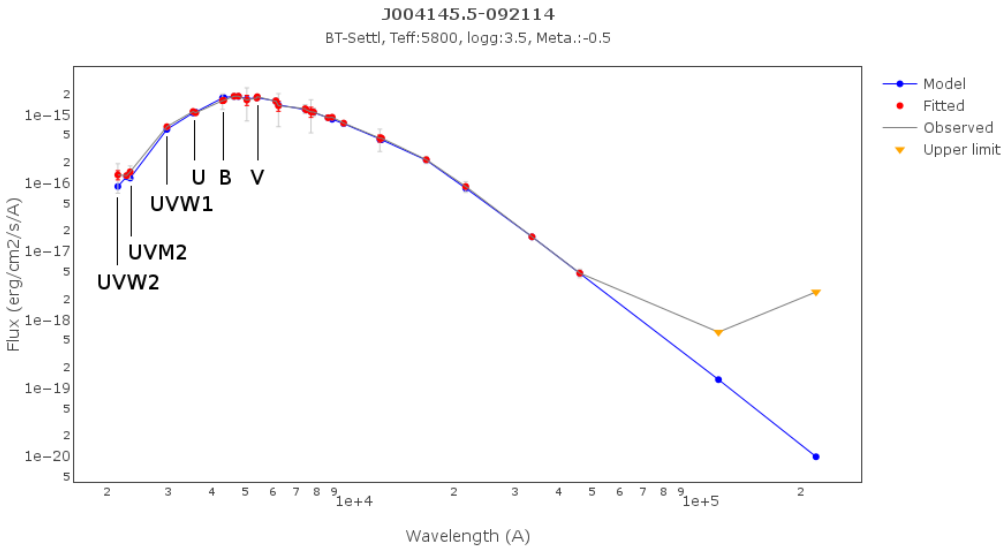

Figure 6: Example.