XMM-Newton CCF Release Note

XMM-CCF-REL-195

OM Photometry: Zero points, AB System and flux conversion factors

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1 CCF components

Name of CCF	VALDATE	List of Blocks changed	CAL VERSION	XSCS flag
OM_COLORTRANS_0010	2000-01-01T00:00:00	Header keywords		No

2 Changes

The zero points used to compute the magnitudes in OM aperture photometry are given as keywords contained in the FITS header of the OM_COLORTRANS CCF. These values have been recomputed taken into consideration two recently implemented corrections in the OM data processing by SAS: the point spread function for the OM UV filters and the time sensitivity degradation correction. The corresponding *ZPTfilter* keywords have been updated.

A widely used magnitude system, **AB** magnitude, has been defined for OM. Its corresponding zero points have been included as keywords as well, *ABM0filter*.Flux conversion factors have been defined within the **AB** system. They allow the user to convert the count rates derived by SAS into fluxes at the effective wavelength of each filter. These conversion factors, *ABF0filter,*are new keywords in the header of OM_COLORTRANS_0010.CCF.

Finally, the existing flux conversion factors *FCFfilter,* based in the observations of white dwarfs standard stars, have also been updated taken into consideration the PSF correction for UV filters and the time sensitivity degradation correction..

3 Scientific Impact of this Update

The OM photometric system is now better than before, since it takes into consideration and applies corrections for more effects present in the OM data.

In addition the newly implemented (SAS 6.5) **AB** system will allow the users to compare their data with other instruments, since is usage is becoming more extended.

4 Estimated Scientific Quality

As it was pointed out before, OM photometry improves with these new reference values, which include more and better corrections to the obtained data.

5 Test procedures

Whenever we make a change or update in the OM photometric calibration, the test procedure consists in reprocessing some data sets for which we have also calibrated ground based observations. Some of those correspond to what is known as standard fields. This is applicable to the OM optical filters (U, B, V).

In the UV (OM filters UVW1, UVM2, UVW2) there is no standard photometric system. Therefore we have compared OM AB magnitudes of several stars (some of them spectrophotometric standards) with data from the literature.

6 Summary of the test results

In next table we can see the comparison of OM AB magnitudes with some other determinations for several stars. It should be noted that in spite that an exact comparison is impossible because the filters are not equal in the different systems, the OM values agree very well with other sources.

```
HZ2
OM filter  lambda    AB_OM   AB_Oke 1974
U          3440.    13.6605  13.74
B          4500.    13.6567  13.72
V          5430.    13.8325  14.04

LBB227
OM filter  lambda    AB_OM   AB_Oke 1974
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```
V           5430.    15.2684  15.24

G93-48
OM filter   lambda    AB_OM   Galex(2271A)
UVW2        2120.    12.3650
UVM2        2310.    12.3820  12.39
UVW1        2910.    12.5384

HZ43
OM filter   lambda    AB_OM   Galex(2271A)
UVW2        2120.    11.2396
UVM2        2310.      --     11.36
UVW1        2910.    12.7067

BD+33 2642
OM filter   lambda    AB_OM   Galex(2271A)
UVW2        2120.    10.4329
UVM2        2310.    10.4522  10.47
UVW1        2910.    10.3756
```

7 Expected updates

No updates are expected in the near future.