Proof for HST $WFC3$ $UVIS$ and IR Channel nJy measurements are wrong

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The context of the paper is related to the flux density of the order of nJy reported in recent papers. The aim is to prove that the reported flux density of the order of nJy is wrong. A new table for both IR and $UVIS$ channel of the $HST/WFC3$ is created of the order of flux density mJy. This table should be used as a template for future projects related to $HST/WFC3$. Any new measurements below mJy (reported in the table) should be rejected for obvious reasons reported in this paper. Due to the advent of algorithms and digital computing technology, these errors are possible.

TABLE I Symbols used

Symbol	Meaning
F_d	Flux density measured
λ_p	Pivot wavelength of the filter
T_{ps}	peak system Throughput of the filter
I	Intensity
A	Area of the HST Primary Mirror = $4.453m^2$
N	Number of pixels at the CCD
	(1024×1024) for IR and (4096×4096) for UVIS
P_M	Power at Mirror
P_P	Power at Pixel
E_P	Energy at Pixel
f	Frequency measured
T_{eff}	Effective temperature measured
h	Planck's Constant
k	Boltzmann's Constant

I. INTRODUCTION

The very sensitive near-infrared imaging with the Wide Field Camera 3 (WFC3/IR) on board the Hubble Space Telescope (HST) has enabled the extension of the observational frontier to beyond $z = 9$, only 500 Myrs after the Big Bang. However while investigating the flux density of the order of nJy (Oesch et al. 2016) (1), it is found that the corresponding frequency of the incident wave is belonging to radio waves not to the IR spectrum.

Section II describes the method employed. Section III examines the measurements made by Oesch et al(1), and proves that the the flux density of the order of nJy corresponds to radio frequencies not to the IR spectrum. Section IV creates a new table of flux density for each of the filters in UVIS and IR channel below which measurements could be rejected. Section V concludes this paper.

II. METHOD EMPLOYED

The flux density measured is converted back to the energy per pixel. This energy is converted back to frequency by dividing by Planck's constant. The table I gives the list of symbols used in this section. ***Power received per pixel can be equated to energy received by pixel.***

$$I = F_d \times \frac{c}{\lambda_p} \tag{1}$$

$$P_M = I \times A \tag{2}$$

$$P_P = P_M \times T_{ps}/N \tag{3}$$

$$E_P = P_P \times 1Second \tag{4}$$

$$f = \frac{E_P}{h} \tag{5}$$

$$T_{eff} = \frac{E_P}{k} \tag{6}$$

TABLE II PHOTOMETRY OF GN-z11

Filter	Flux Density [nJy]
B_{435}	7 ± 9
V_{606}	2 ± 7
i_{775}	5 ± 10
I_{814}	3 ± 7
z_{850}	17 ± 11
Y_{105}	-7 ± 9
J_{125}	11 ± 8
JH_{140}	64 ± 13
H_{160}	152 ± 10

TABLE III Summarizing the results of previous HST project data set

Filter	Pivot (nm)	Width (nm)	Intensity (W/m^2)	power at mirror (W)	pixel power (W/pixel)	photon frequency (Hz)	temperature (K)
B_{435}	432.5	61.8	1.109059×10^{-19}	4.938869×10^{-19}	7.065109×10^{-27}	1.066259×10^{7}	5.1172×10^{-4}
V_{606}	588.7	218.2	4.583204×10^{-20}	2.040996×10^{-19}	3.527932×10^{-27}	5.324317×10^{6}	2.553×10^{-4}
i_{775}	764.7	117.1	5.880590×10^{-20}	2.618749×10^{-19}	3.590060×10^{-27}	5.418080×10^{6}	2.6003×10^{-4}
I_{814}	802.4	153.6	3.736197×10^{-20}	1.663806×10^{-19}	2.280923×10^{-27}	3.442344×10^{6}	1.6521×10^{-4}
z_{850}	916.6	118.2	9.157963×10^{-20}	4.078231×10^{-19}	2.430815×10^{-27}	3.668560×10^{6}	1.7606×10^{-4}
Y_{105}	1055.2	265.0	5.682192×10^{-21}	2.530398×10^{-20}	1.254851×10^{-26}	1.893808×10^{7}	9.0888×10^{-4}
J_{125}	1248.6	284.5	4.561955×10^{-20}	2.031533×10^{-19}	1.084956×10^{-25}	1.637403×10^{8}	0.0079
JH_{140}	1392.3	384.0	3.208294×10^{-19}	1.428720×10^{-18}	7.630187×10^{-25}	1.151540×10^{9}	0.0553
H_{160}	1536.9	268.3	3.160022×10^{-19}	1.407223×10^{-18}	7.515384×10^{-25}	1.134214×10^{9}	0.0544

III. EXAMINING THE RESULTS OF A PREVIOUS HST PROJECT DATA SET

According to photo electric effect the the emitted electrons depend on the frequency not the intensity. The measurements made by a previous HST mission project conducted by(Principal Investigator Oesch .P. A.) Oesch et al (1) is examined in this section. The frequency calculated using the method in section II falls outside the pass band of the filter. In fact the frequency calculated falls in the radio frequency spectrum. Table II summarizes the photometry of GN-z11 (Oesch et al.) (1). For calculations, only the + sign is taken. Table III summarizes the frequency calculated using the method described in section II. It is clear from table III that the calculated frequency falls in the radio frequency spectrum not in the pass band of the filter. Then, how this measurements can be taken as valid input for various other papers reporting flux density of the order of nJy?

IV. NEW SENSITIVITY PARAMETERS FOR IR AND UVIS CHANNEL

In this section one photon of pivot wavelength is considered per pixel. The pixel energy is calculated using equation 7. This one photon energy is taken as one photon power per pixel and the flux density is calculated using a reverse process employed in section II. The input for this process is tabled in table IV and table V. These inputs are taken from the $HST/WFC3$ instrument handbook. The output are summarized in table VI and table VII.

$$E_p = h \times \frac{c}{\lambda_p} \tag{7}$$

V. CONCLUSIONS

Any measurements below the mJy summarized in table VI and table VII should be rejected. Because below those values, the photon's frequency itself does not correspond to the passband of the filter. Due to the advent of computer algorithms and digital computing technology, this error might have been possible.

TABLE IV IR input parameters

Filter	Pivot (λ_p) (nm)	Width ($\Delta\lambda$) (nm)	Peak System Throughput (T_{ps})
F105W	1055.2	265.0	0.520
F110W	1153.4	443.0	0.560
F125W	1248.6	284.5	0.560
F140W	1392.3	384.0	0.560
F160W	1536.9	268.3	0.560
F098M	986.4	157.0	0.470
F127M	1274.0	68.8	0.540
F139M	1383.8	64.3	0.540
F153M	1532.2	68.5	0.550
F126N	1258.5	15.2	0.500
F128N	1283.2	15.9	0.520
F130N	1300.6	15.6	0.540
F132N	1318.8	16.1	0.520
F164N	1640.4	20.9	0.470
F167N	1664.2	21.0	0.460

REFERENCES

[1] P. A. Oesch, G.Brammer, P. G. Van DDokkum, G.D. Illingworth, R.J. Bouwens, I. Labbe, M. Franx, I. Momcheva, M. L. N. Ashby, G. G. Fazio, V.Gonzalez, B. Holden, D. Megee, R. E. Skelton, R. Smit, L. R. Spitler, M. Trenti, S. P. Willner. A REMARKABLY LUMINOUS GALAXY AT Z= 11.1 MEASURED WITH HUBBLE SPACE TELESCOPE GRISM SPECTROSCOPY, arXiv:1603.00461v1 [astro-ph.GA] 1 Mar 2016

TABLE V UVIS input parameters

Filter	Pivot (λ_p) (nm)	Width ($\Delta\lambda$) (nm)	Peak System Throughput (T_{ps})
F200LP	488.3	502.2	0.330
F300X	280.7	66.3	0.170
F350LP	584.6	475.8	0.290
F475X	493.9	205.6	0.280
F600LP	744.4	229.2	0.290
F850LP	916.6	118.2	0.090
F218W	222.4	32.2	0.050
F225W	235.9	46.7	0.100
F275W	270.4	39.8	0.130
F336W	335.5	51.1	0.200
F390W	392.1	89.6	0.250
F438W	432.5	61.8	0.240
F475W	477.3	134.4	0.270
F555W	530.8	156.2	0.280
F606W	588.7	218.2	0.290
F625W	624.2	146.3	0.280
F775W	764.7	117.1	0.230
F814W	802.4	153.6	0.230
F390M	389.7	20.4	0.220
F410M	410.9	17.2	0.270
FQ422M	421.9	11.2	0.190
F467M	468.3	20.1	0.280
F547M	544.7	65.0	0.260
F621M	621.9	60.9	0.280
F689M	687.6	68.3	0.250
F763M	761.2	70.4	0.210
F845M	843.6	78.7	0.140
FQ232N	241.3	3.4	0.040
FQ243N	246.8	3.6	0.050
F280N	283.1	4.3	0.060
F343N	343.5	25.0	0.210
F373N	373.0	5.0	0.180
FQ378N	379.2	9.9	0.200
FQ387N	387.4	3.4	0.180
F395N	395.5	8.5	0.220
FQ436N	436.7	4.3	0.190
FQ437N	437.1	3.0	0.200
F469N	468.8	5.0	0.200
F487N	487.1	6.0	0.250
FQ492N	493.3	11.4	0.250
F502N	501.0	6.5	0.260
FQ508N	509.1	13.1	0.260
FQ575N	575.8	1.8	0.230
FQ619N	619.9	6.1	0.260
F631N	630.4	5.8	0.250
FQ634N	634.9	6.4	0.260
F645N	645.4	8.4	0.250
F656N	656.1	1.8	0.240
F657N	656.7	12.1	0.260
F658N	658.4	2.8	0.260
F665N	665.6	13.1	0.260
FQ672N	671.6	1.9	0.250
F673N	676.6	11.8	0.250
FQ674N	673.1	1.8	0.190
F680N	687.7	37.1	0.250
FQ727N	727.5	6.4	0.210
FQ750N	750.3	7.0	0.180
FQ889N	889.2	9.8	0.100
FQ906N	905.8	9.9	0.080
FQ924N	924.8	9.2	0.080
FQ937N	937.2	9.3	0.070
F953N	953.0	9.7	0.050

TABLE VI New IR sensitivity parameters

Filter	power/photon(p_p) ($W/photon/pixel$)	electrons(n_e) ($e^-/second/pixel$)	power at CCD(p_c) (W)	Intensity(I) (W/m^2)	Flux density(F_d) (mJy)
F105W	1.882532×10^{-19}	1.2	1.973977×10^{-13}	8.524441×10^{-14}	7.535
F110W	1.722254×10^{-19}	1.1	1.805914×10^{-13}	7.241625×10^{-14}	10.701
F125W	1.590940×10^{-19}	1.0	1.668221×10^{-13}	6.689485×10^{-14}	6.348
F140W	1.426738×10^{-19}	0.9	1.496043×10^{-13}	5.999060×10^{-14}	7.684
F160W	1.292503×10^{-19}	0.8	1.355287×10^{-13}	5.434635×10^{-14}	4.864
F098M	2.013835×10^{-19}	1.3	2.111660×10^{-13}	1.008912×10^{-13}	5.284
F127M	1.559221×10^{-19}	1.0	1.634962×10^{-13}	6.798934×10^{-14}	1.560
F139M	1.435502×10^{-19}	0.9	1.505233×10^{-13}	6.259461×10^{-14}	1.343
F153M	1.296467×10^{-19}	0.8	1.359445×10^{-13}	5.550420×10^{-14}	1.268
F126N	1.578425×10^{-19}	1.0	1.655098×10^{-13}	7.433285×10^{-14}	0.377
F128N	1.548042×10^{-19}	1.0	1.623240×10^{-13}	7.009811×10^{-14}	0.372
F130N	1.527331×10^{-19}	1.0	1.601523×10^{-13}	6.659882×10^{-14}	0.347
F132N	1.506254×10^{-19}	0.9	1.579421×10^{-13}	6.820587×10^{-14}	0.366
F164N	1.210953×10^{-19}	0.8	1.269776×10^{-13}	6.066754×10^{-14}	0.423
F167N	1.193635×10^{-19}	0.7	1.251617×10^{-13}	6.109992×10^{-14}	0.428

TABLE VII New UVIS sensitivity parameters

Filter	power/photon(p_p) ($W/photon/pixel$)	electrons(n_e) ($e^-/second/pixel$)	power at CCD(p_c) (W)	Intensity(I) (W/m^2)	Flux density(F_d) (mJy)
F200LP	4.068088×10^{-19}	2.5	6.825119×10^{-12}	4.644333×10^{-12}	778.000
F300X	7.076763×10^{-19}	4.4	1.187284×10^{-11}	1.568313×10^{-11}	346.837
F350LP	3.397960×10^{-19}	2.1	5.700831×10^{-12}	4.414354×10^{-12}	700.601
F475X	4.021963×10^{-19}	2.5	6.747733×10^{-12}	5.411616×10^{-12}	371.133
F600LP	2.668521×10^{-19}	1.7	4.477036×10^{-12}	3.466727×10^{-12}	265.041
F850LP	2.167191×10^{-19}	1.4	3.635943×10^{-12}	9.071971×10^{-12}	357.683
F218W	8.931867×10^{-19}	5.6	1.498519×10^{-11}	6.730064×10^{-11}	722.860
F225W	8.420718×10^{-19}	5.3	1.412762×10^{-11}	3.172459×10^{-11}	494.188
F275W	7.346329×10^{-19}	4.6	1.232509×10^{-11}	2.128992×10^{-11}	282.642
F336W	5.920856×10^{-19}	3.7	9.933549×10^{-12}	1.115325×10^{-11}	190.109
F390W	5.066175×10^{-19}	3.2	8.499632×10^{-12}	7.634615×10^{-12}	228.178
F438W	4.592942×10^{-19}	2.9	7.705678×10^{-12}	7.209857×10^{-12}	148.626
F475W	4.161842×10^{-19}	2.6	6.982413×10^{-12}	5.807227×10^{-12}	260.344
F555W	3.742365×10^{-19}	2.3	6.278646×10^{-12}	5.035413×10^{-12}	262.359
F606W	3.374295×10^{-19}	2.1	5.661127×10^{-12}	4.383611×10^{-12}	319.055
F625W	3.182389×10^{-19}	2.0	5.339163×10^{-12}	4.281956×10^{-12}	208.961
F775W	2.597682×10^{-19}	1.6	4.358187×10^{-12}	4.255054×10^{-12}	166.204
F814W	2.475632×10^{-19}	1.5	4.153422×10^{-12}	4.055134×10^{-12}	207.767
F390M	5.097376×10^{-19}	3.2	8.551977×10^{-12}	8.729129×10^{-12}	59.399
F410M	4.834381×10^{-19}	3.0	8.110746×10^{-12}	6.745655×10^{-12}	38.702
FQ422M	4.708337×10^{-19}	2.9	7.899278×10^{-12}	9.336001×10^{-12}	34.879
F467M	4.241826×10^{-19}	2.6	7.116604×10^{-12}	5.707446×10^{-12}	38.266
F547M	3.646865×10^{-19}	2.3	6.118424×10^{-12}	5.284371×10^{-12}	114.574
F621M	3.194159×10^{-19}	2.0	5.358909×10^{-12}	4.297792×10^{-12}	87.306
F689M	2.888958×10^{-19}	1.8	4.846867×10^{-12}	4.353596×10^{-12}	99.185
F763M	2.609626×10^{-19}	1.6	4.378226×10^{-12}	4.681725×10^{-12}	109.941
F845M	2.354727×10^{-19}	1.5	3.950576×10^{-12}	6.336645×10^{-12}	166.346
FQ232N	8.232272×10^{-19}	5.1	1.381146×10^{-11}	7.753659×10^{-11}	87.936
FQ243N	8.048814×10^{-19}	5.0	1.350367×10^{-11}	6.064693×10^{-11}	72.827
F280N	7.016769×10^{-19}	4.4	1.177218×10^{-11}	4.405882×10^{-11}	63.195
F343N	5.782962×10^{-19}	3.6	9.702200×10^{-12}	1.037476×10^{-11}	86.516
F373N	5.325596×10^{-19}	3.3	8.934867×10^{-12}	1.114661×10^{-11}	18.591
FQ378N	5.238521×10^{-19}	3.3	8.788780×10^{-12}	9.867921×10^{-12}	32.587
FQ387N	5.127639×10^{-19}	3.2	8.602751×10^{-12}	1.073228×10^{-11}	12.172
F395N	5.022623×10^{-19}	3.1	8.426563×10^{-12}	8.601117×10^{-12}	24.387
FQ436N	4.548769×10^{-19}	2.8	7.631568×10^{-12}	9.019599×10^{-12}	12.937
FQ437N	4.544606×10^{-19}	2.8	7.624584×10^{-12}	8.560777×10^{-12}	8.567
F469N	4.237302×10^{-19}	2.6	7.109014×10^{-12}	7.981902×10^{-12}	13.312
F487N	4.078110×10^{-19}	2.5	6.841933×10^{-12}	6.145622×10^{-12}	12.300
FQ492N	4.026854×10^{-19}	2.5	6.755941×10^{-12}	6.068382×10^{-12}	23.076
F502N	3.964965×10^{-19}	2.5	6.652107×10^{-12}	5.745303×10^{-12}	12.457
FQ508N	3.901880×10^{-19}	2.4	6.546269×10^{-12}	5.653893×10^{-12}	24.706
FQ575N	3.449891×10^{-19}	2.2	5.787957×10^{-12}	5.650990×10^{-12}	3.393
FQ619N	3.204464×10^{-19}	2.0	5.376199×10^{-12}	4.643324×10^{-12}	9.448
F631N	3.151090×10^{-19}	2.0	5.286652×10^{-12}	4.748624×10^{-12}	9.187
FQ634N	3.128756×10^{-19}	2.0	5.249182×10^{-12}	4.533622×10^{-12}	9.678
F645N	3.077855×10^{-19}	1.9	5.163783×10^{-12}	4.638259×10^{-12}	12.996
F656N	3.027659×10^{-19}	1.9	5.079570×10^{-12}	4.752725×10^{-12}	2.854
F657N	3.024893×10^{-19}	1.9	5.074929×10^{-12}	4.383123×10^{-12}	17.691
F658N	3.017083×10^{-19}	1.9	5.061825×10^{-12}	4.371806×10^{-12}	4.083
F665N	2.984446×10^{-19}	1.9	5.007070×10^{-12}	4.324514×10^{-12}	18.897
FQ672N	2.957783×10^{-19}	1.8	4.962337×10^{-12}	4.457315×10^{-12}	2.825
F673N	2.935926×10^{-19}	1.8	4.925666×10^{-12}	4.424376×10^{-12}	17.415
FQ674N	2.951192×10^{-19}	1.8	4.951279×10^{-12}	5.851818×10^{-12}	3.514
F680N	2.888538×10^{-19}	1.8	4.846162×10^{-12}	4.352963×10^{-12}	53.869
FQ727N	2.730512×10^{-19}	1.7	4.581039×10^{-12}	4.898597×10^{-12}	10.458
FQ750N	2.647537×10^{-19}	1.7	4.441831×10^{-12}	5.541362×10^{-12}	12.939
FQ889N	2.233971×10^{-19}	1.4	3.747982×10^{-12}	8.416365×10^{-12}	27.512
FQ906N	2.193031×10^{-19}	1.4	3.679295×10^{-12}	1.032765×10^{-11}	34.105
FQ924N	2.147975×10^{-19}	1.3	3.603704×10^{-12}	1.011547×10^{-11}	31.042
FQ937N	2.119555×10^{-19}	1.3	3.556024×10^{-12}	1.140758×10^{-11}	35.388
F953N	2.084415×10^{-19}	1.3	3.497068×10^{-12}	1.570584×10^{-11}	50.817