

Titan Solar and Stellar Occultations

UVIS acquired about 30 occultations, most of them stellar but several are solar occultations. Stellar occultations were obtained in both the EUV and FUV channels, whereas solar occultations are only in the EUV channel. These occultations are of uneven quality determined by the signal/noise, sampling rate, and pointing jitter. Most of the occultations were obtained while the spacecraft was on thruster control and for those the pointing drift was often large enough to put the star outside of the slit. Where this occurs can be seen in plots of signal as a function of time, included below. These plots also give a sense of signal level summed for the entire spectrum. As can be seen from the plots for UVIS_231ST_EPSORI001_PRIME, three stars in Orion's sword were observed in different parts of the UVIS slit.

In what follows we give a table listing the occultations, a summary plot showing the ray paths of the whole set of occultations as functions of altitude and latitude and plots showing summed signal versus time for the EUV and (for stellar occultations) FUV. In the summary plot the line thickness is proportional to the count rate.

Table 1. List of occultation ID, start and end times, and latitude where the ray path crosses the 1000-Km altitude. Solar occultations have the identifier SU after the orbit number.

Observation ID	Start Time	End Time	Latitude
UVIS_023ST_BETORIO04_PRIME	2006-120T19:42:14	2006-120T20:23:14	-15.5
UVIS_035ST_ALPERIO02_PRIME	2006-346T10:31:31	2006-346T10:57:31	-35.2
UVIS_037ST_ETAUMA002_ENGR	2007-013T09:37:31	2007-013T10:00:49	-7.7
UVIS_037ST_ETAUMA002_PRIME	2007-013T10:00:49	2007-013T10:14:31	-7.7
UVIS_040SU_USUNOCC002_PRIME	2007-069T01:02:00	2007-069T01:38:00	-76.6
UVIS_046SU_USUNOCC800_PRIME	2007-164T17:39:11	2007-164T18:10:11	-50.0
UVIS_049ST_SIGSGR002_PRIME	2007-243T05:32:34	2007-243T05:55:34	-34.6
UVIS_055ST_ALPLYR002_ENGR	2008-005T20:25:20	2008-005T20:46:20	51.5
UVIS_055ST_ALPLYR002_PRIME	2008-005T20:46:20	2008-005T21:02:20	51.5
UVIS_059ST_ETACMA002_PRIME	2008-053T19:18:07	2008-053T20:02:07	-38.8
UVIS_059ST_EPSCMA003_PRIME	2008-054T15:25:07	2008-054T17:55:07	-5.1
UVIS_059ST_EPSCMA004_PRIME	2008-054T21:20:07	2008-054T23:35:07	-24.9
UVIS_093ST_ETAUMATIO01_PRIME	2008-324T14:58:28	2008-324T15:09:28	0.8
UVIS_093ST_ETAUMATIO02_PRIME	2008-324T15:10:28	2008-324T15:31:28	0.8
UVIS_093ST_BETCMATIO01_PRIME	2008-324T16:20:28	2008-324T16:36:28	54.2
UVIS_095ST_EPSCMATI001_PRIME	2008-340T15:08:49	2008-340T15:20:45	19.8
UVIS_107ST_ALPERITIO01_PRIME	2009-093T22:27:47	2009-094T00:27:47	35.6
UVIS_109ST_ALPERITIO01_PRIME	2009-109T21:20:45	2009-109T22:45:45	38.2
UVIS_109SU_USUNOCC001_PRIME	2009-110T00:10:45	2009-110T00:46:45	-23.2
UVIS_112ST_ETAUMATIO01_ENGR	2009-157T20:32:01	2009-157T20:53:10	-37.4
UVIS_112ST_ETAUMATIO02_PRIME	2009-157T20:53:10	2009-157T21:41:01	-37.4
UVIS_114SU_USUNOCC001_PRIME	2009-189T15:32:03	2009-189T16:37:03	85.2
UVIS_114ST_ETAUMATIO01_ENGR	2009-189T17:30:03	2009-189T17:51:08	-7.3
UVIS_114ST_ETAUMATIO01_PRIME	2009-189T17:51:08	2009-189T18:29:03	-7.3
UVIS_119SU_USUNOCC001_PRIME	2009-285T06:48:16	2009-285T07:45:25	-3.6
UVIS_119SU_USUNOCC002_PRIME	2009-285T08:15:25	2009-285T09:01:25	-66.1
UVIS_153SU_USUNOCC001_PRIME	2011-255T02:23:06	2011-255T03:19:06	30.9
UVIS_153SU_USUNOCC001_PRIME	2011-255T02:23:06	2011-255T03:19:06	23.5

UVIS_204ST_ETAUMATI001_PRIME	2014-136T23:12:15	2014-137T02:12:15	46.4
UVIS_204ST_ETAUMATI002_PRIME	2014-137T07:27:15	2014-137T11:56:15	-33.8
UVIS_206SU_UTISUNOCC001_PRIME	2014-201T09:55:58	2014-201T11:11:58	-65.1
UVIS_206SU_UTISUNOCC001_PRIME	2014-201T09:55:58	2014-201T11:11:58	56.8
UVIS_206ST_ALPERITI001_PRIME	2014-201T11:30:58	2014-201T13:40:58	-37.4
UVIS_208ST_ETAUMATI001_PRIME	2014-265T00:08:19	2014-265T02:23:19	-27.7
UVIS_209ST_ALPLYR001_PRIME	2014-294T12:55:00	2014-294T14:15:00	-6.1
UVIS_231SU_UTISUNOCC001_PRIME	2016-031T23:48:05	2016-032T01:51:05	-63.8
UVIS_231SU_UTISUNOCC001_PRIME	2016-031T23:48:05	2016-032T01:51:05	49.9
UVIS_231ST_EPSORIO01_PRIME	2016-032T01:51:05	2016-032T03:05:05	33.7
UVIS_231ST_EPSORIO01_PRIME	2016-032T01:51:05	2016-032T03:05:05	7.1
UVIS_231ST_EPSORIO01_PRIME	2016-032T01:51:05	2016-032T03:05:05	33.7
UVIS_231ST_EPSORIO01_PRIME	2016-032T01:51:05	2016-032T03:05:05	7.1
UVIS_231ST_EPSORIO01_PRIME	2016-032T01:51:05	2016-032T03:05:05	33.7
UVIS_234SU_UTISUNOCC001_PRIME	2016-095T18:57:42	2016-095T19:12:42	-58.0
UVIS_234SU_UTISUNOCC005_PRIME	2016-095T19:13:42	2016-095T19:51:42	-58.0
UVIS_234SU_UTISUNOCC006_PRIME	2016-095T20:13:42	2016-095T20:47:42	59.1

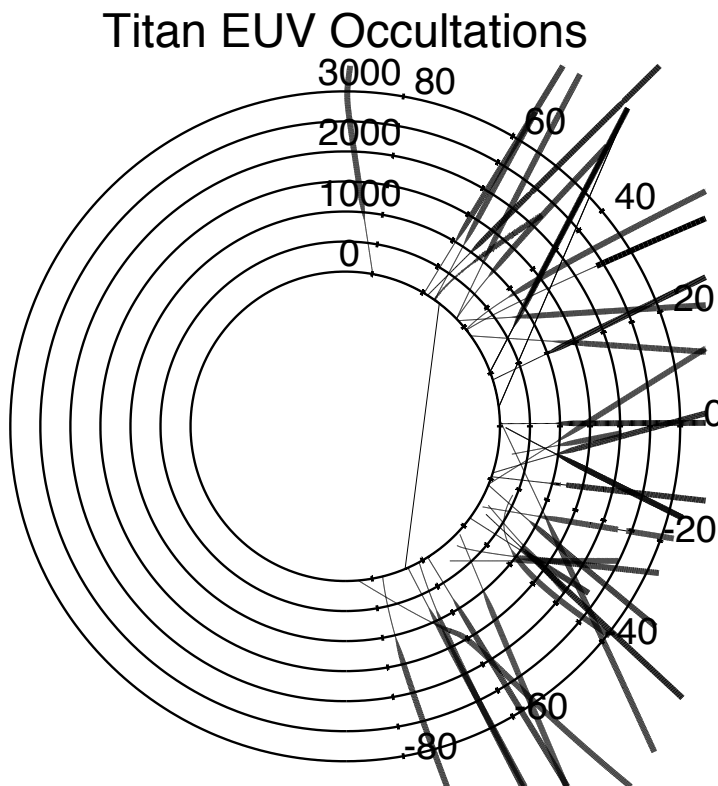
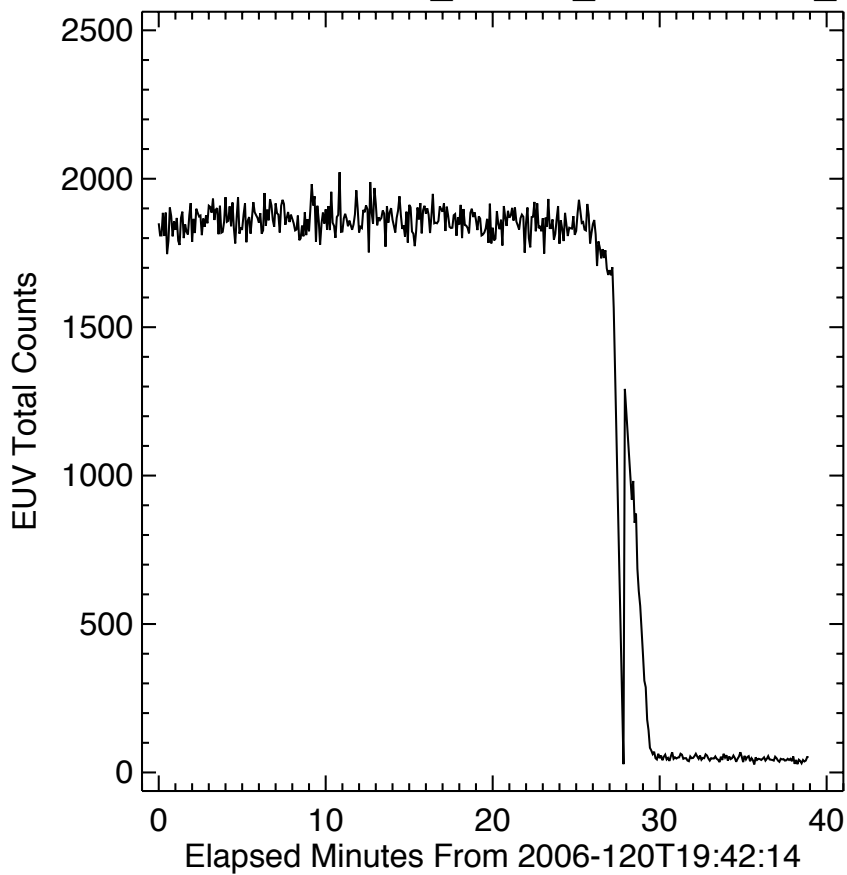


Figure 1. A Schematic Plot of Occultation track vs. altitude. The line thickness is proportional to the count rate. Note: All occultations poleward of 55 deg. are solar.

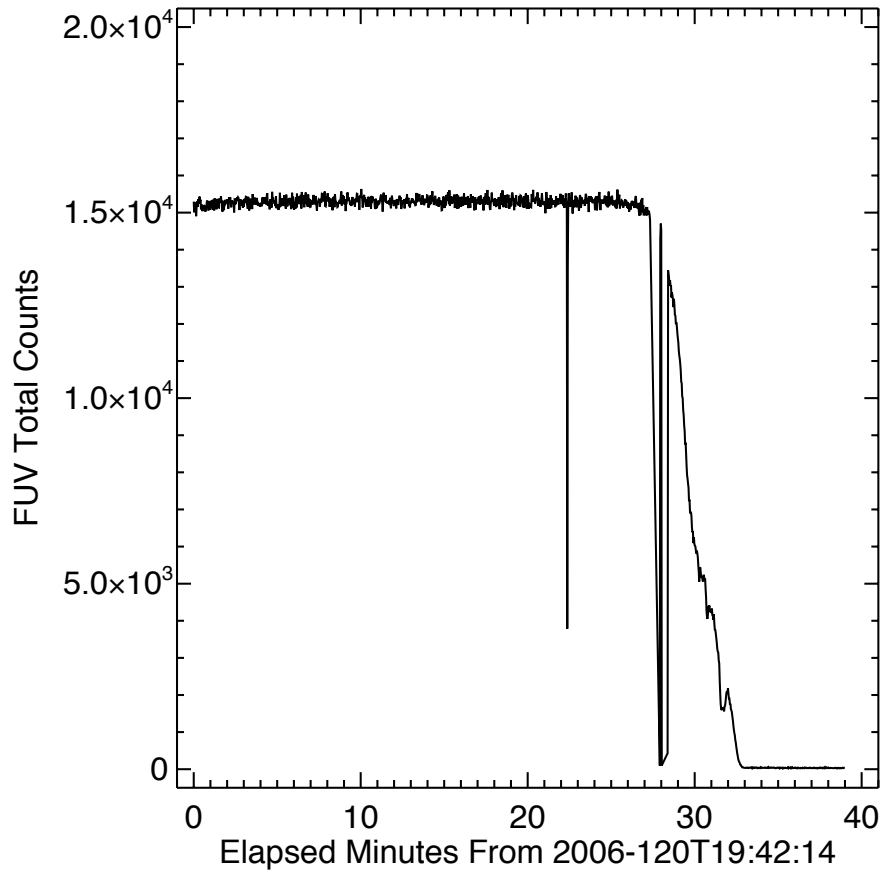
Plots of signal level (counts per integration) as a function of time commence here.

Titan Occultation UVIS_023ST_BETORI004_PRIME



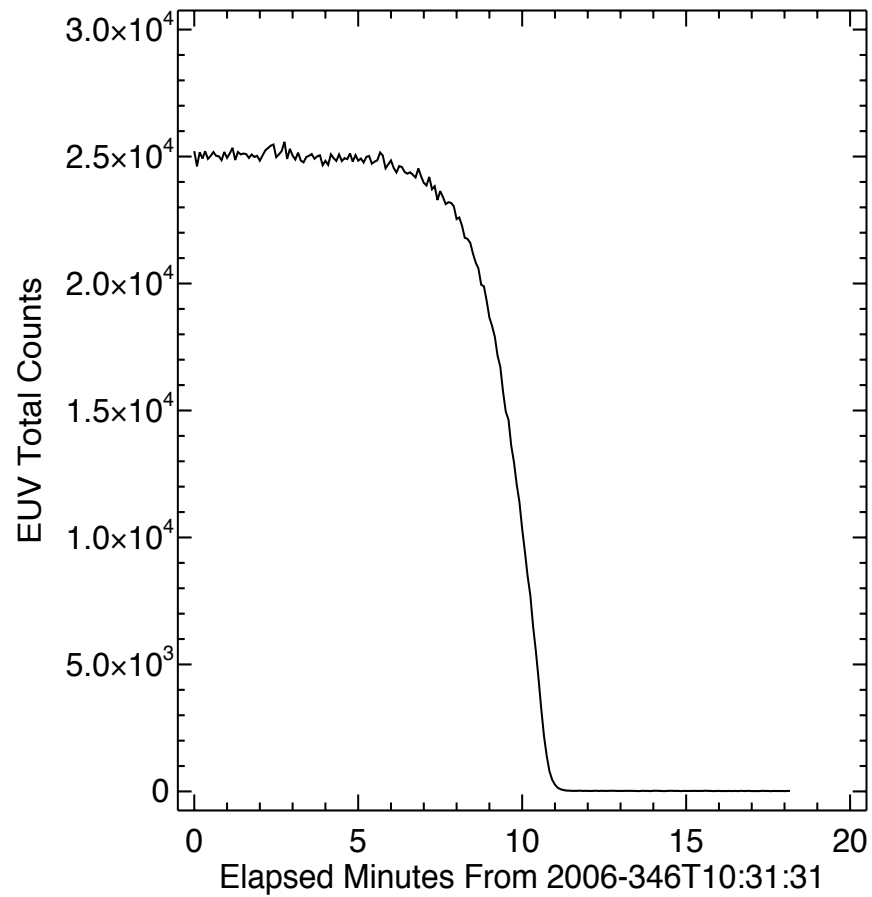
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Titan Occultation UVIS_023ST_BETORI004_PRIME



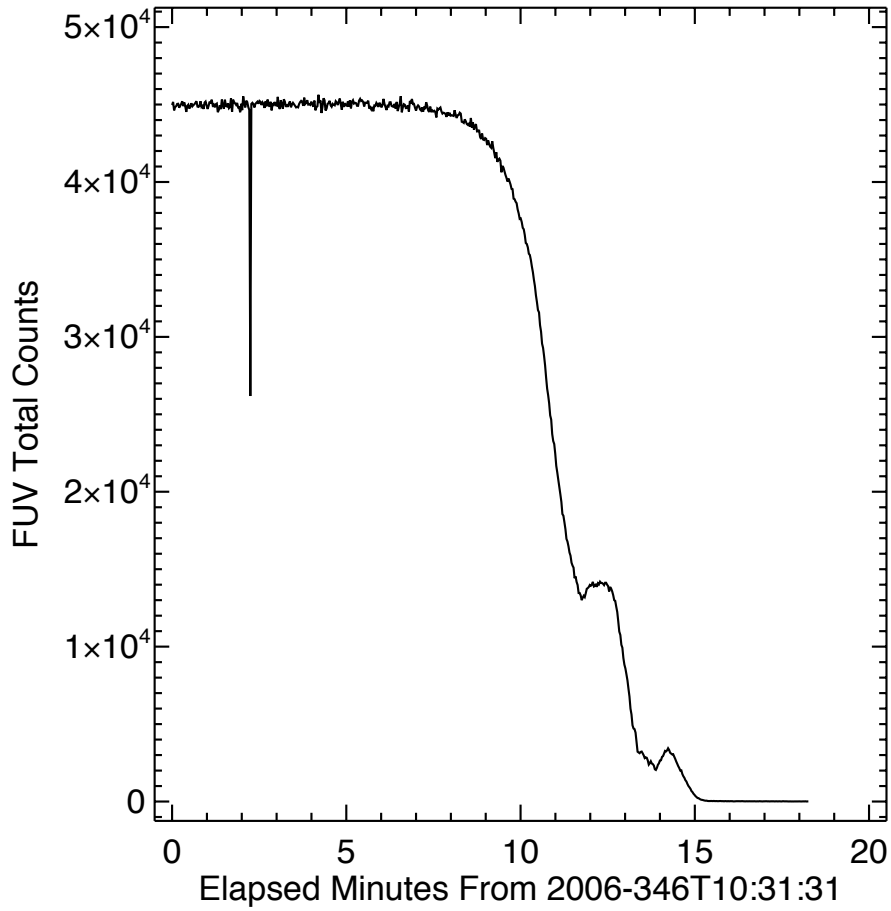
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Titan Occultation UVIS_035ST_ALPERI002_PRIME



UVIS_035ST_ALPERI002_PRIME

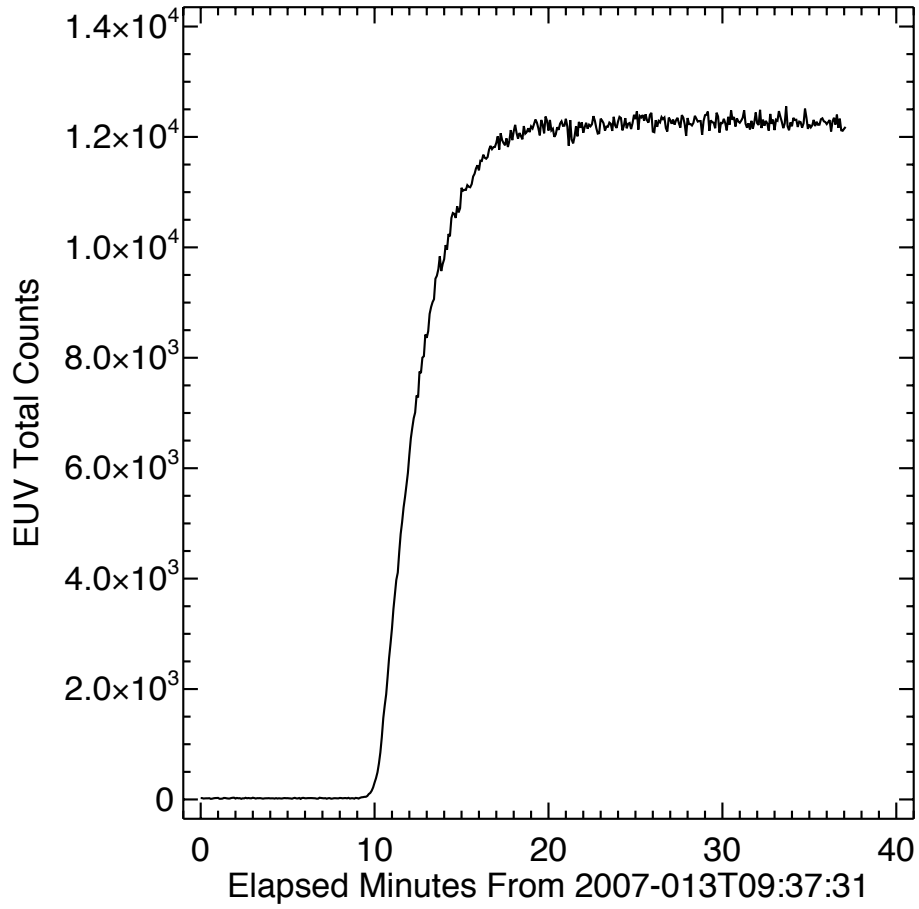
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x

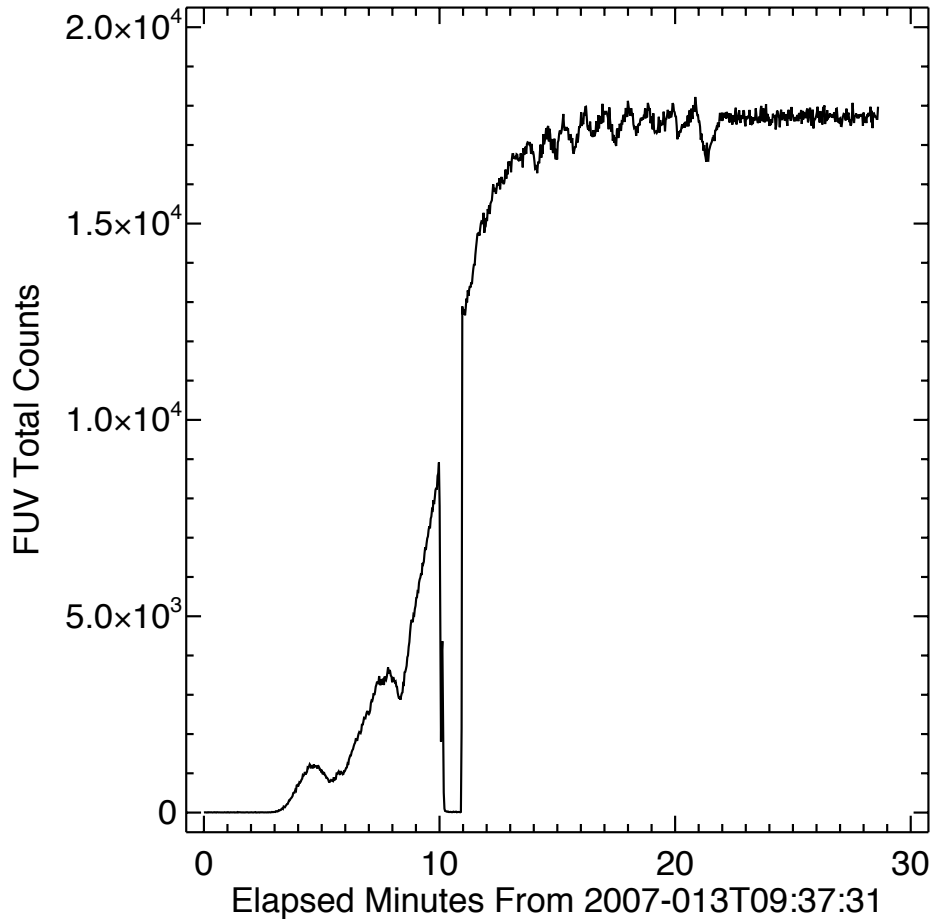
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Titan Occultation UVIS_037ST_ETAUMA002_ENGR



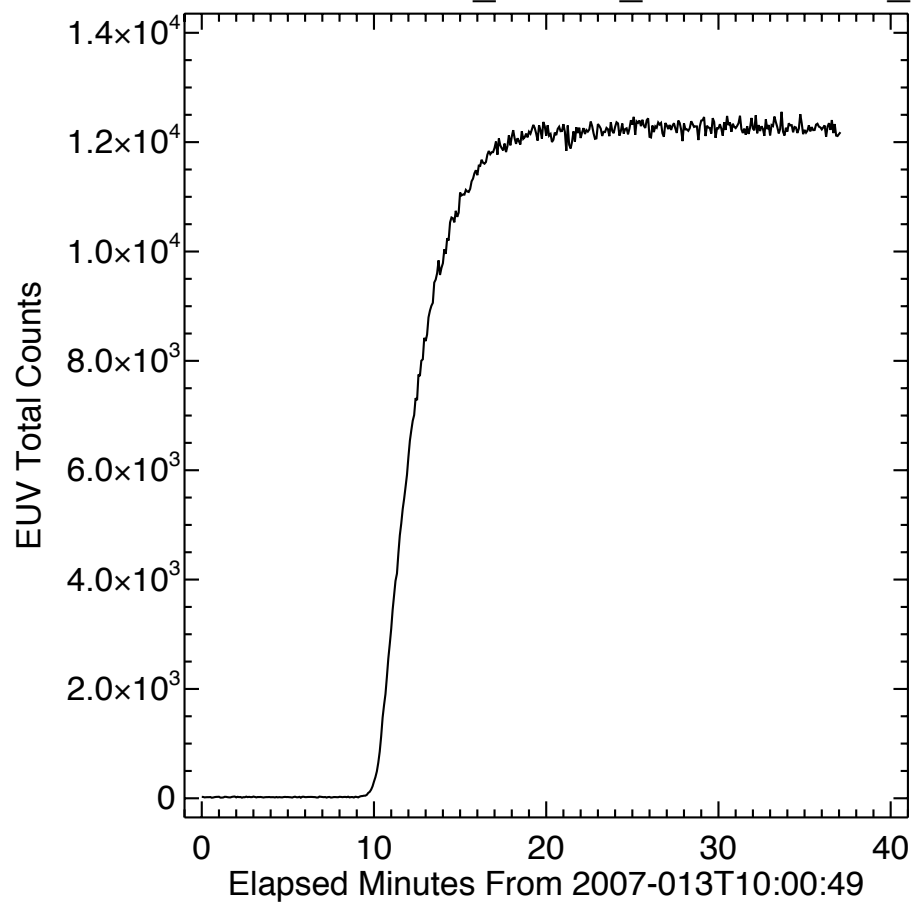
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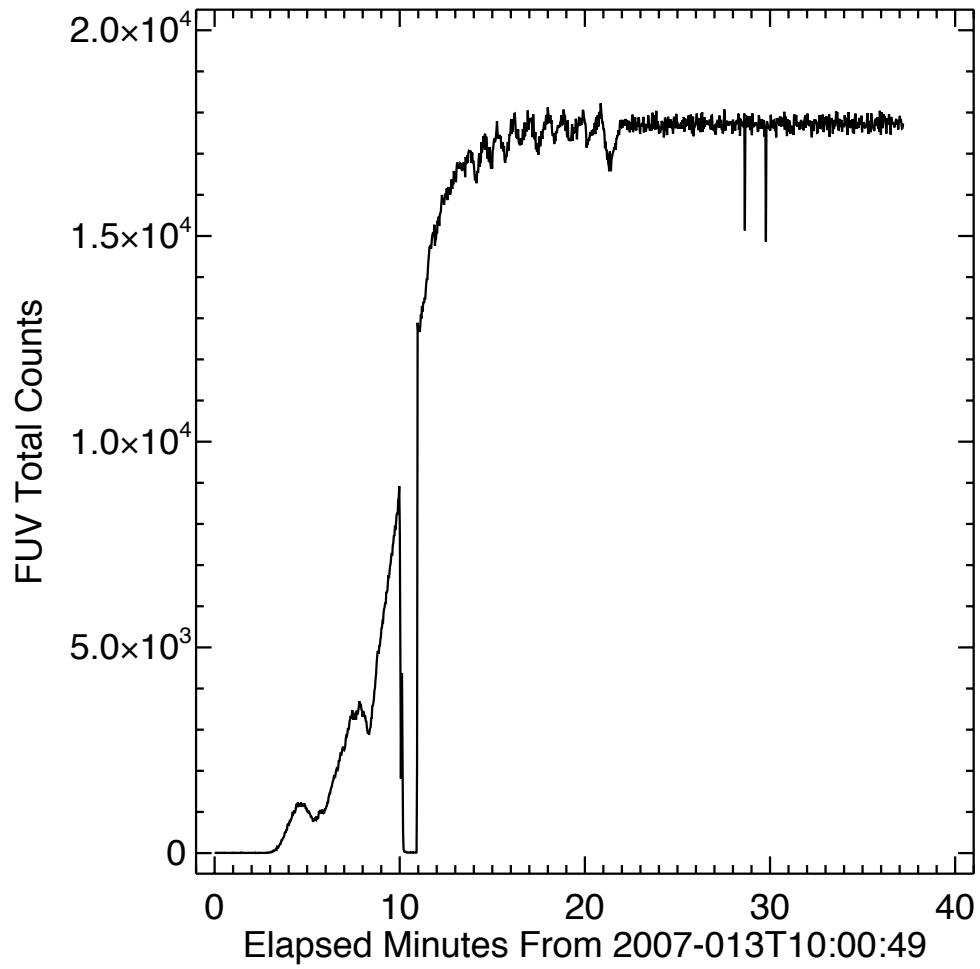
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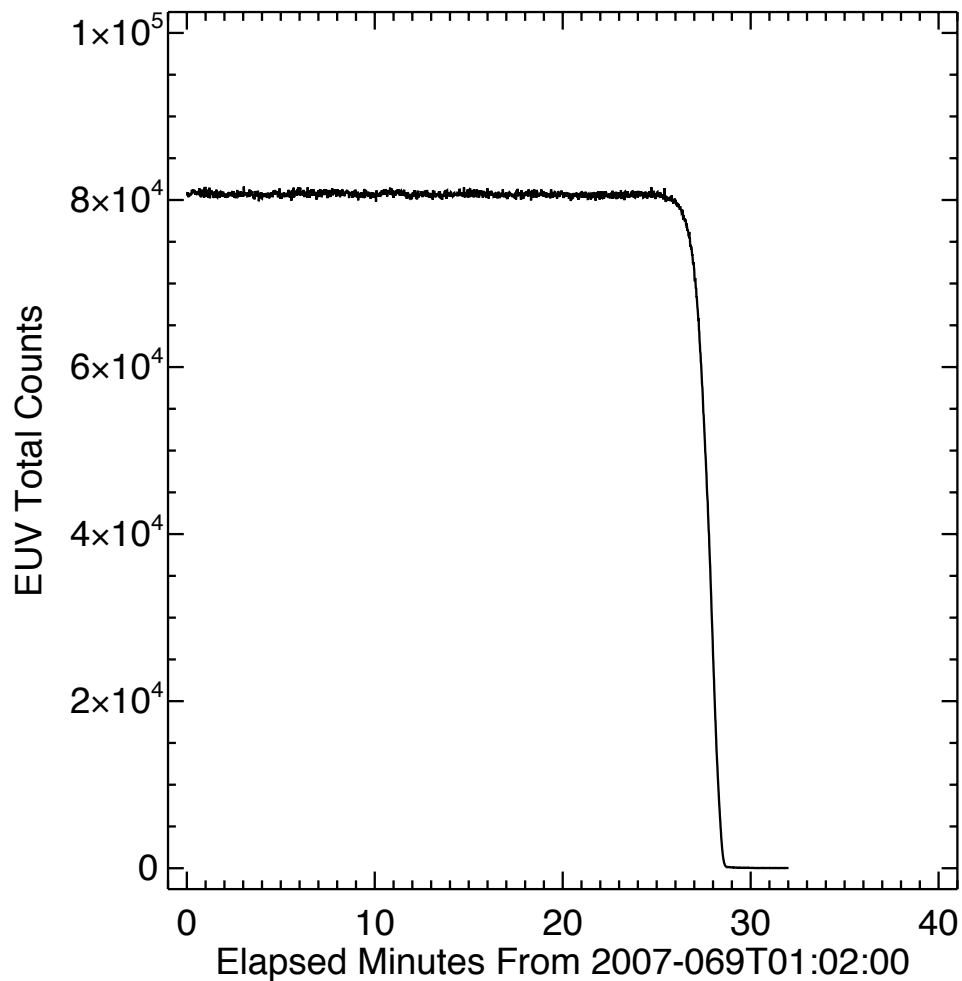
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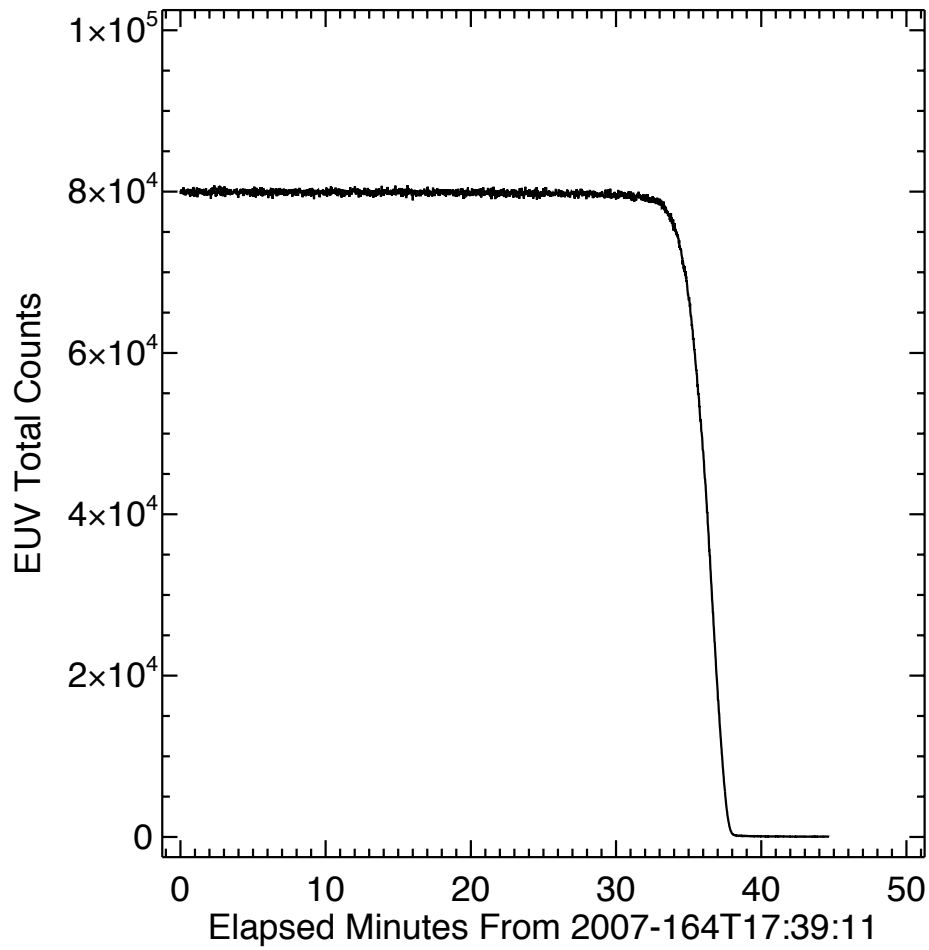
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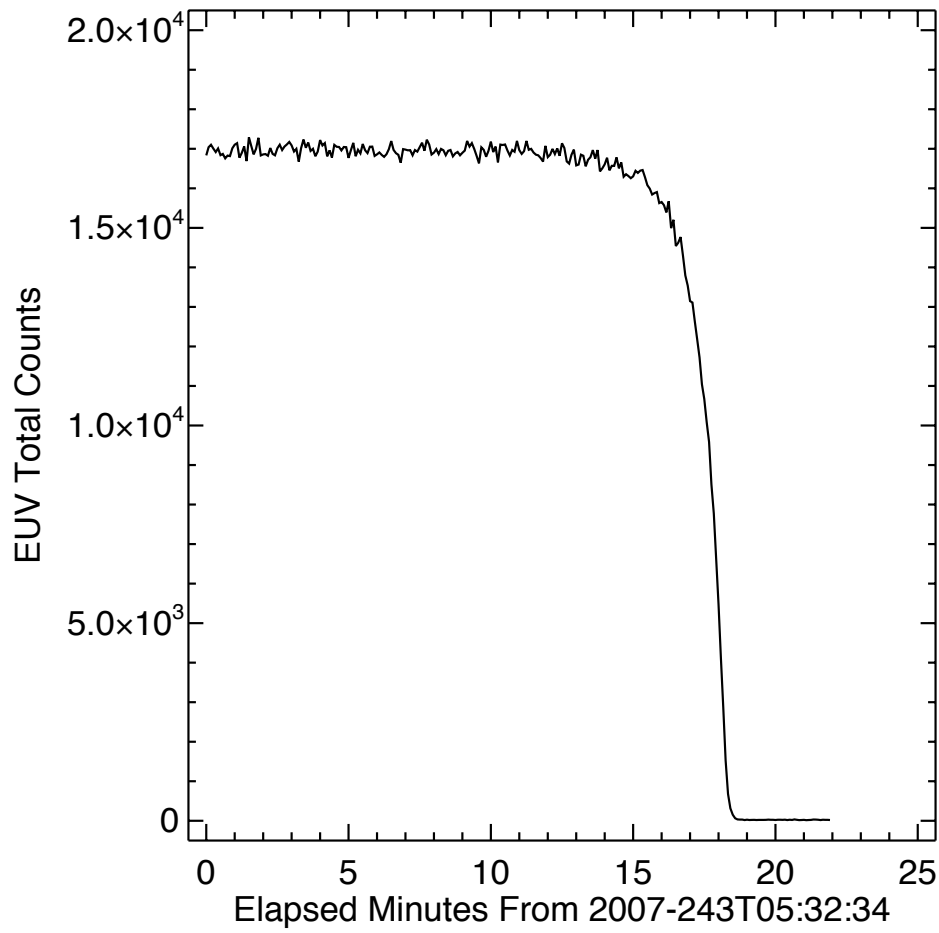
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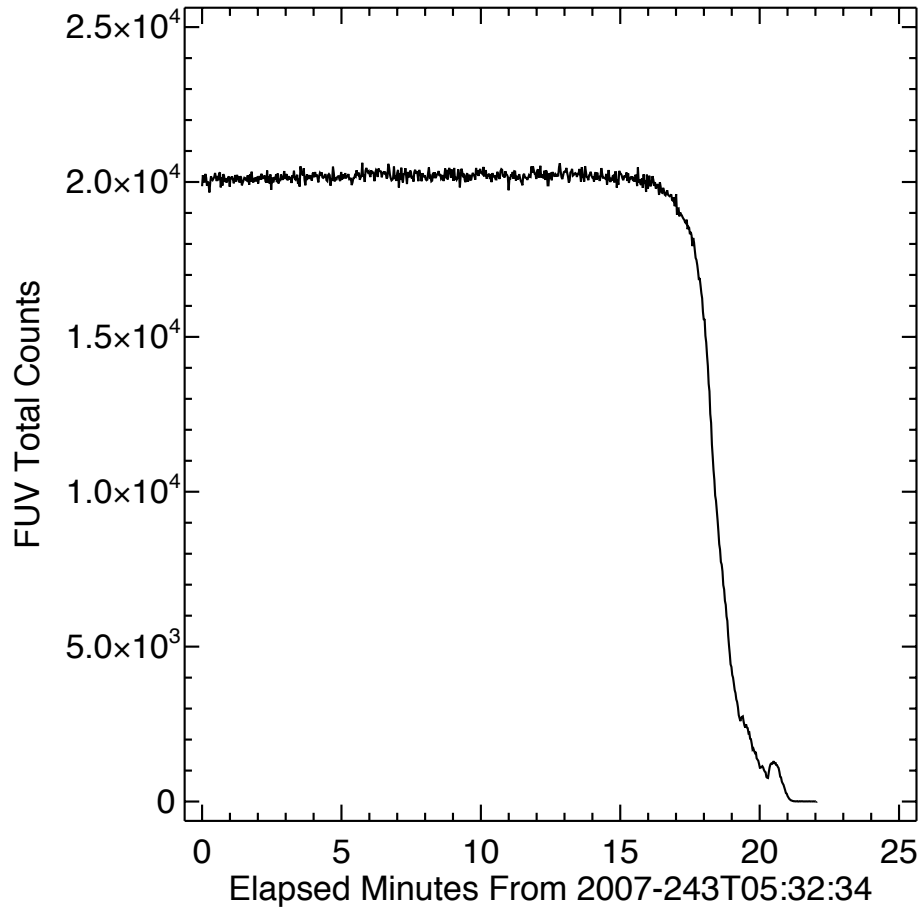
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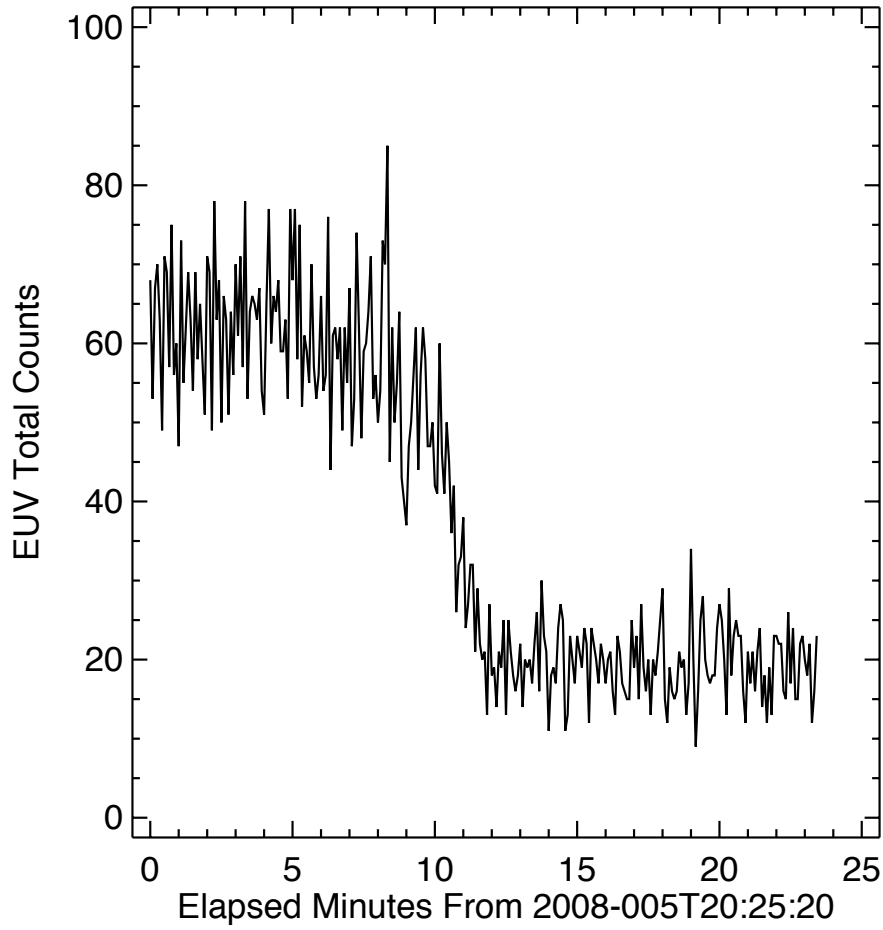
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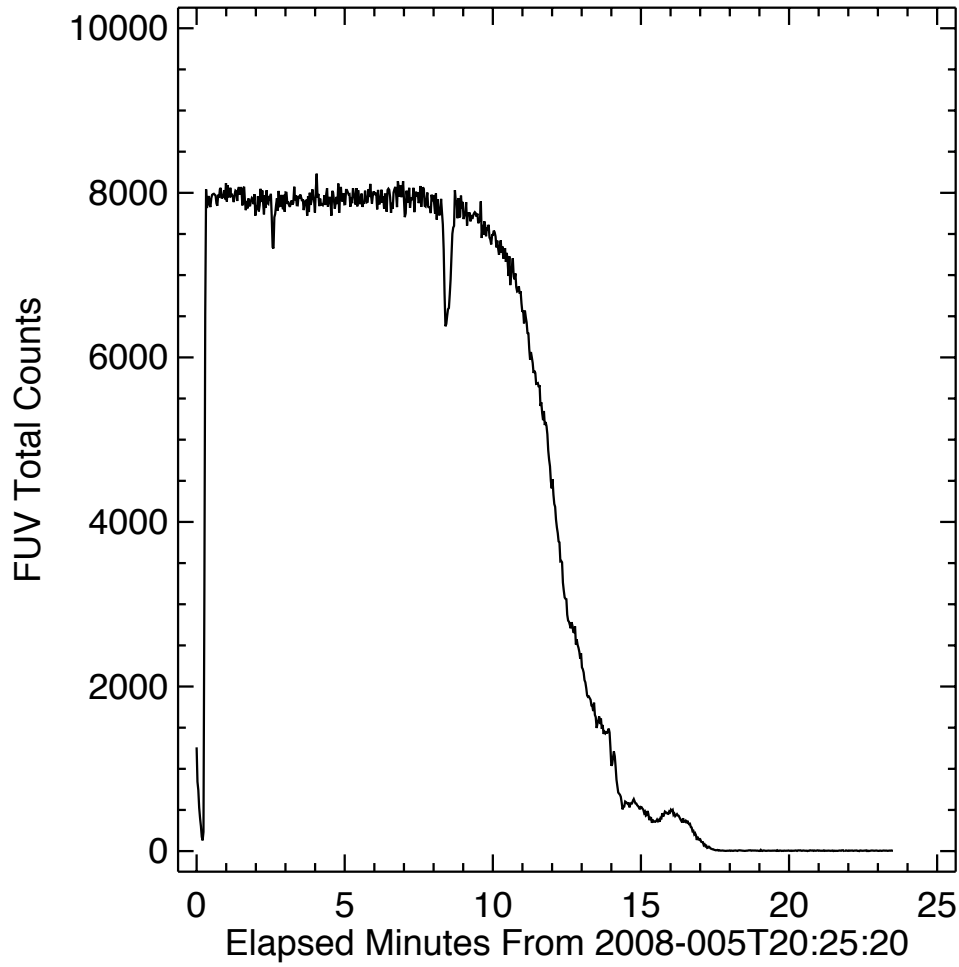
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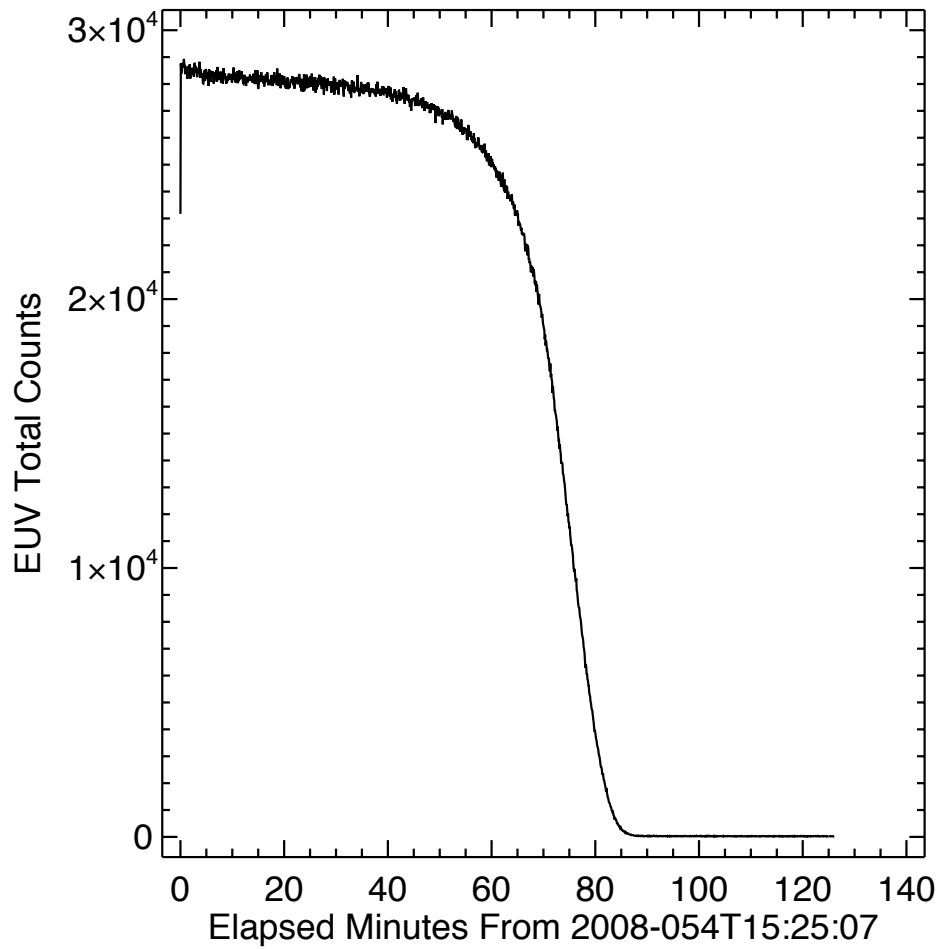
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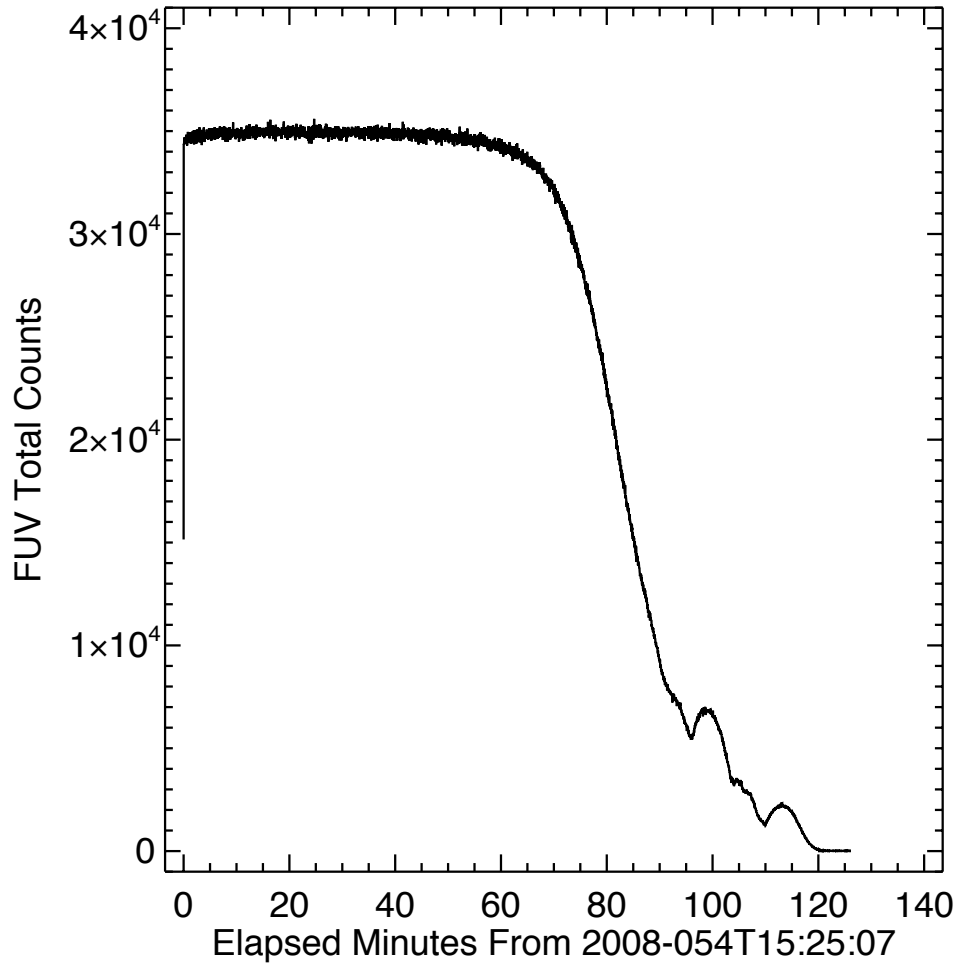
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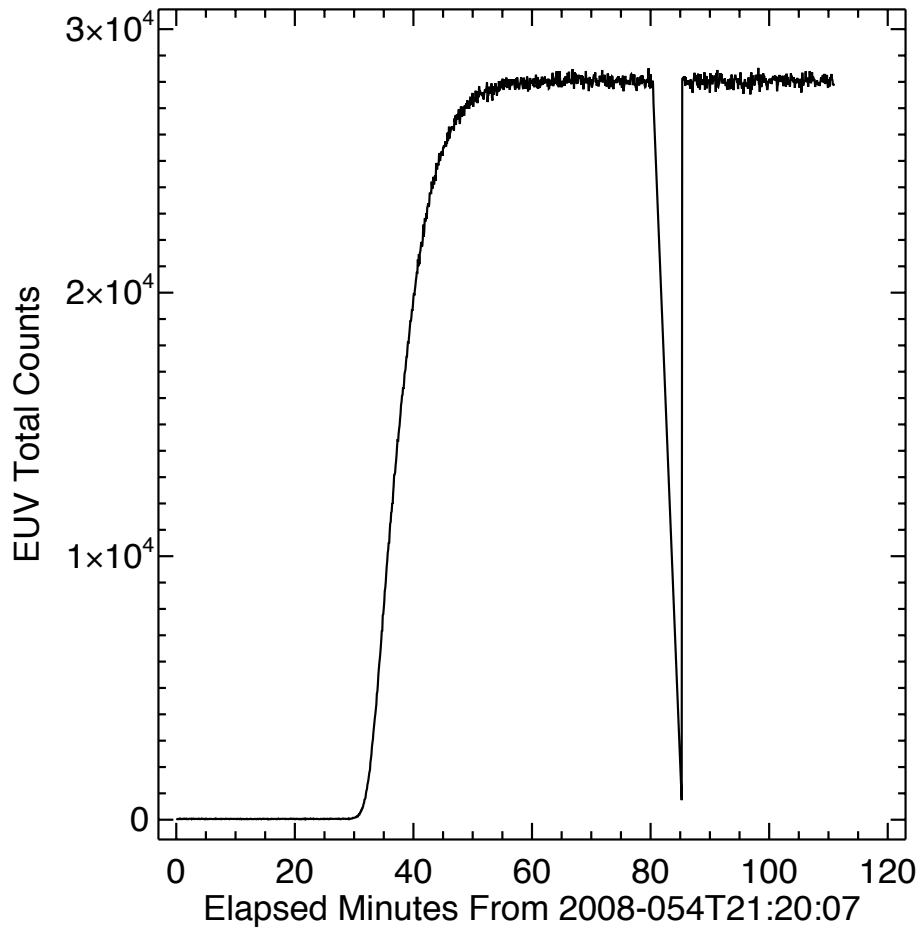
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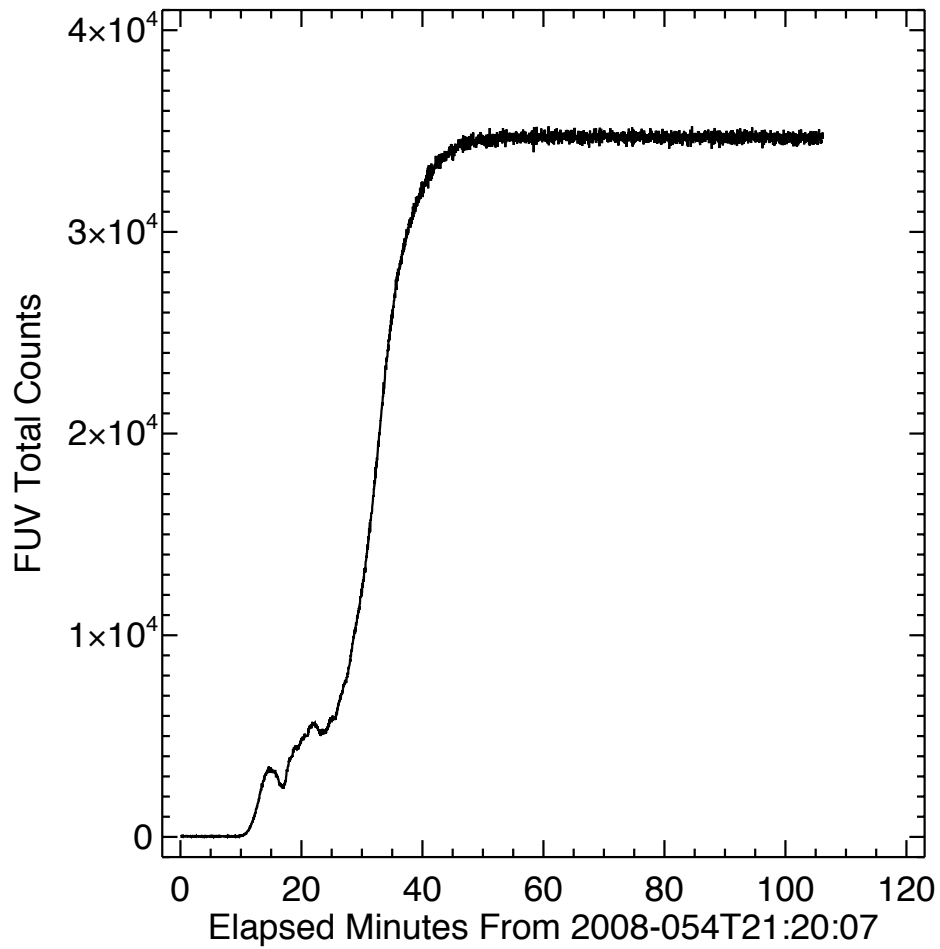
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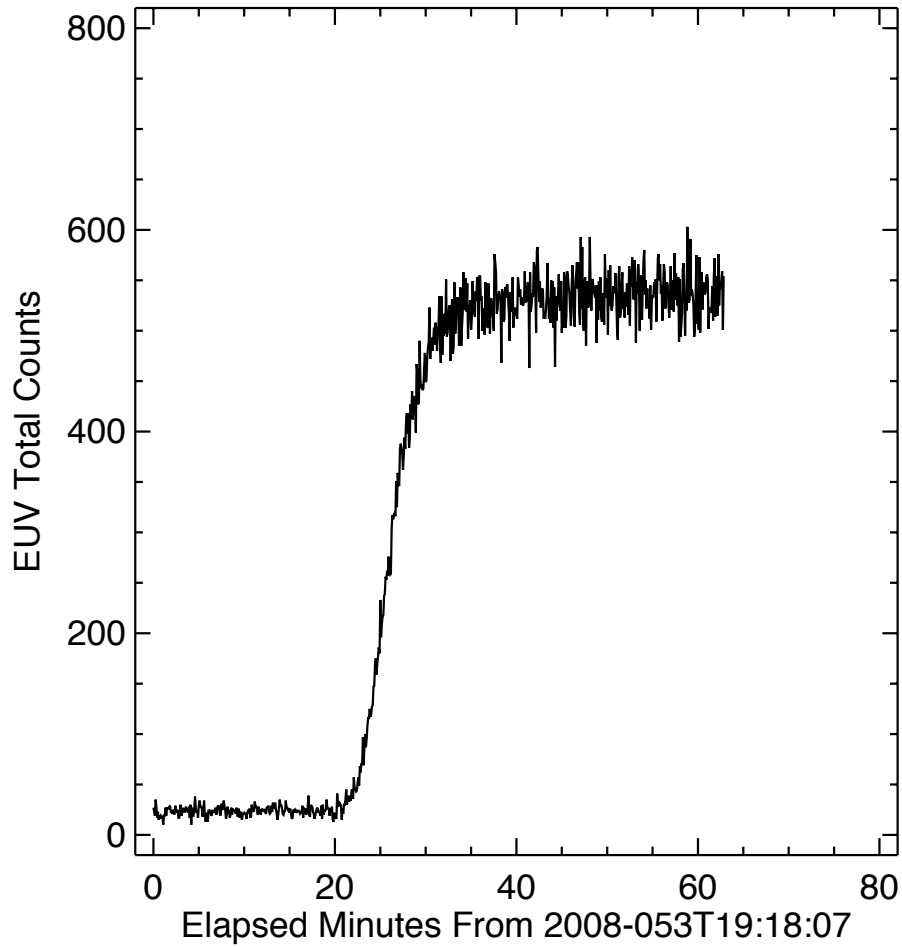
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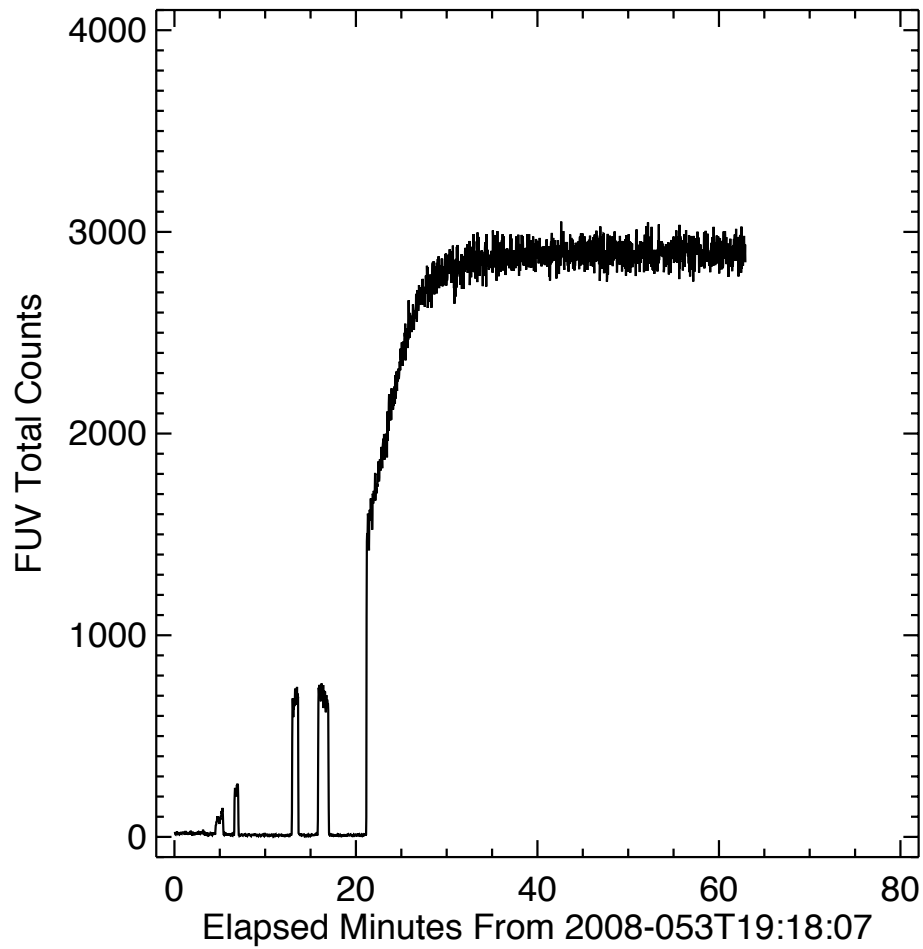
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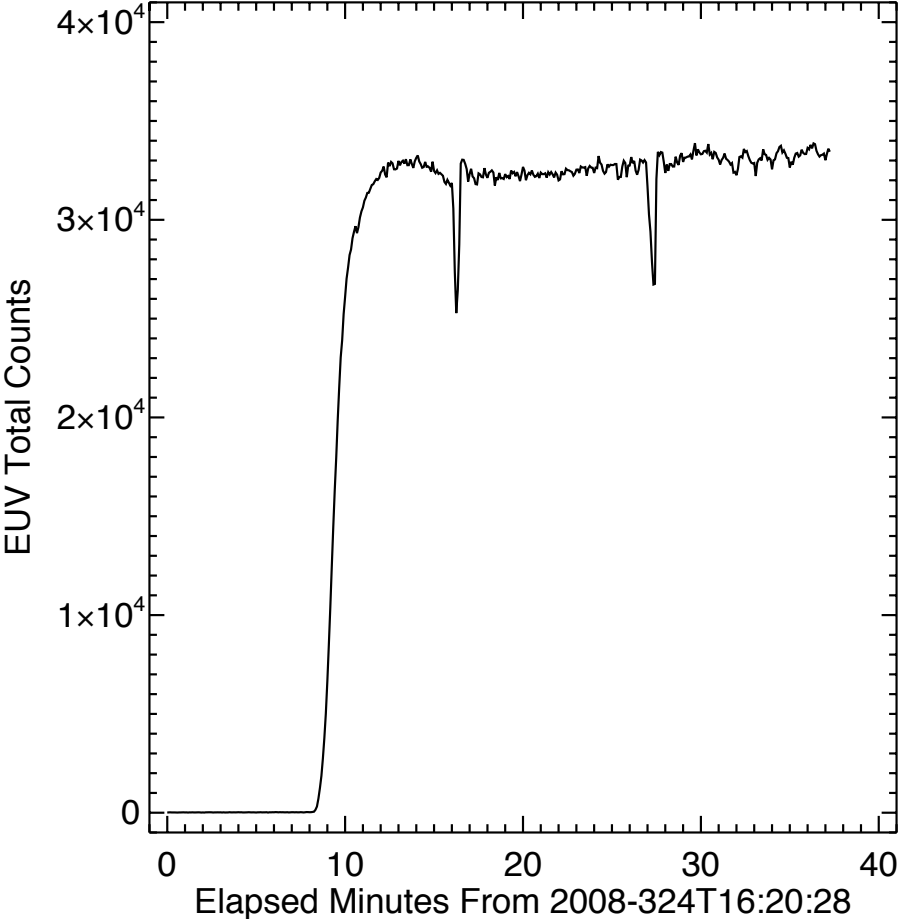
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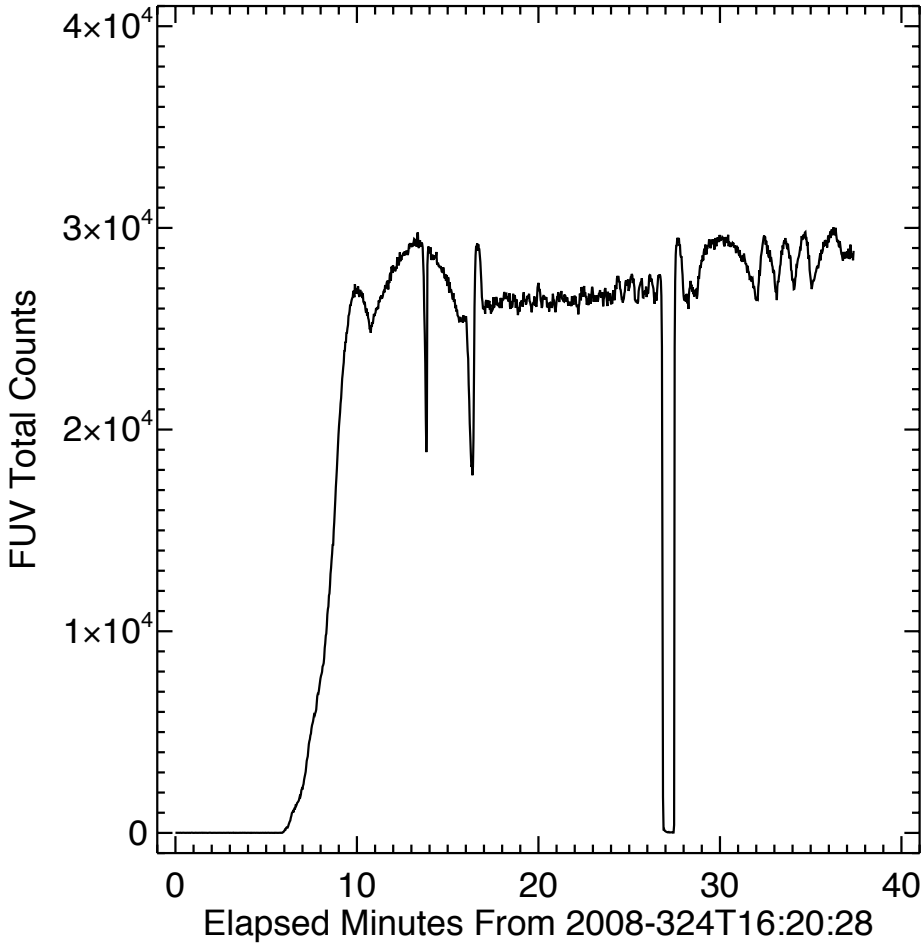
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Titan Occultation UVIS_093ST_BETCMATI001_PRIME



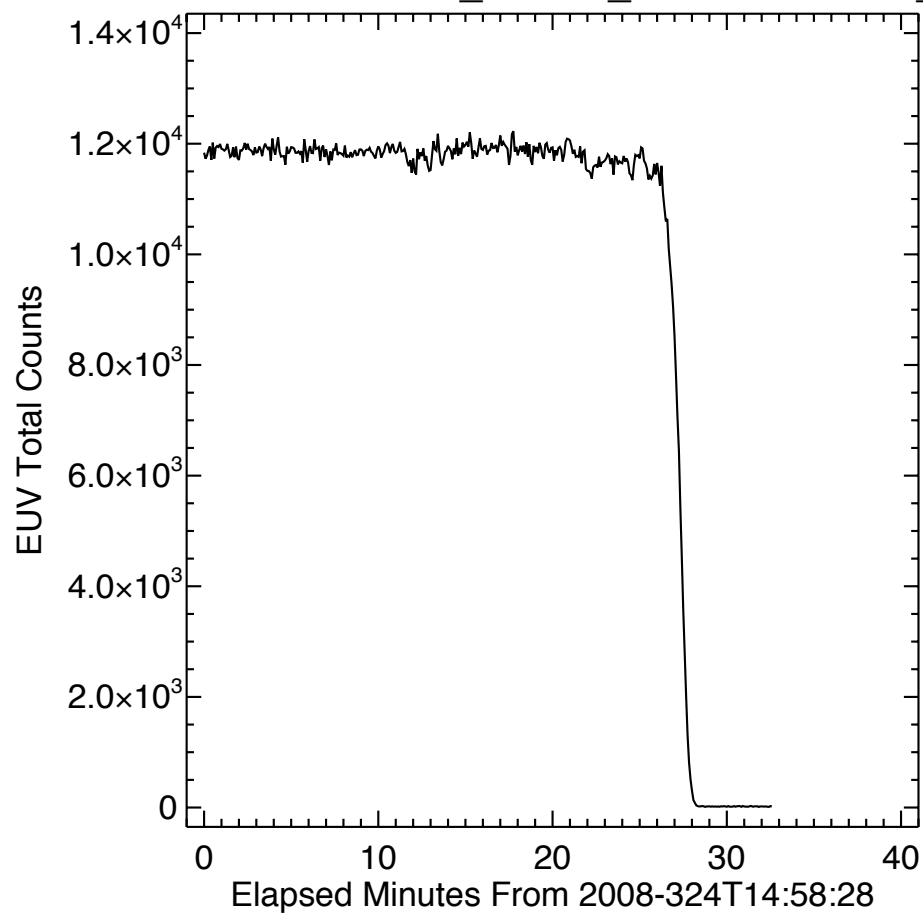
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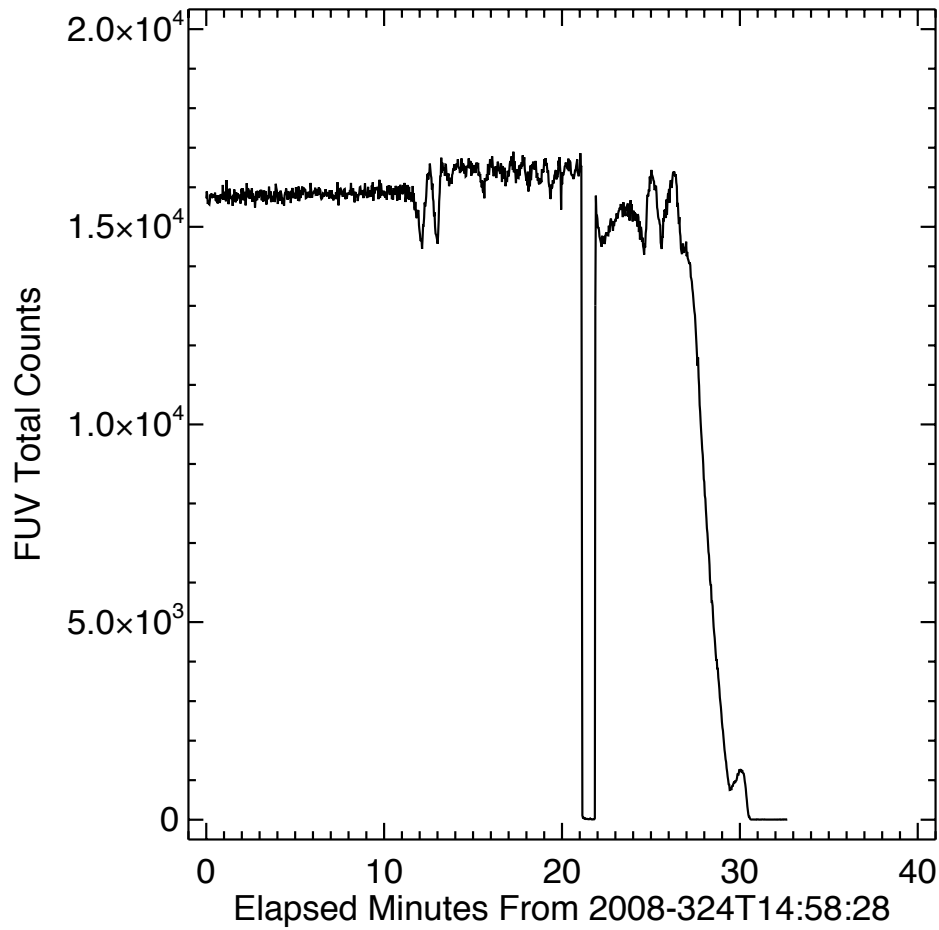
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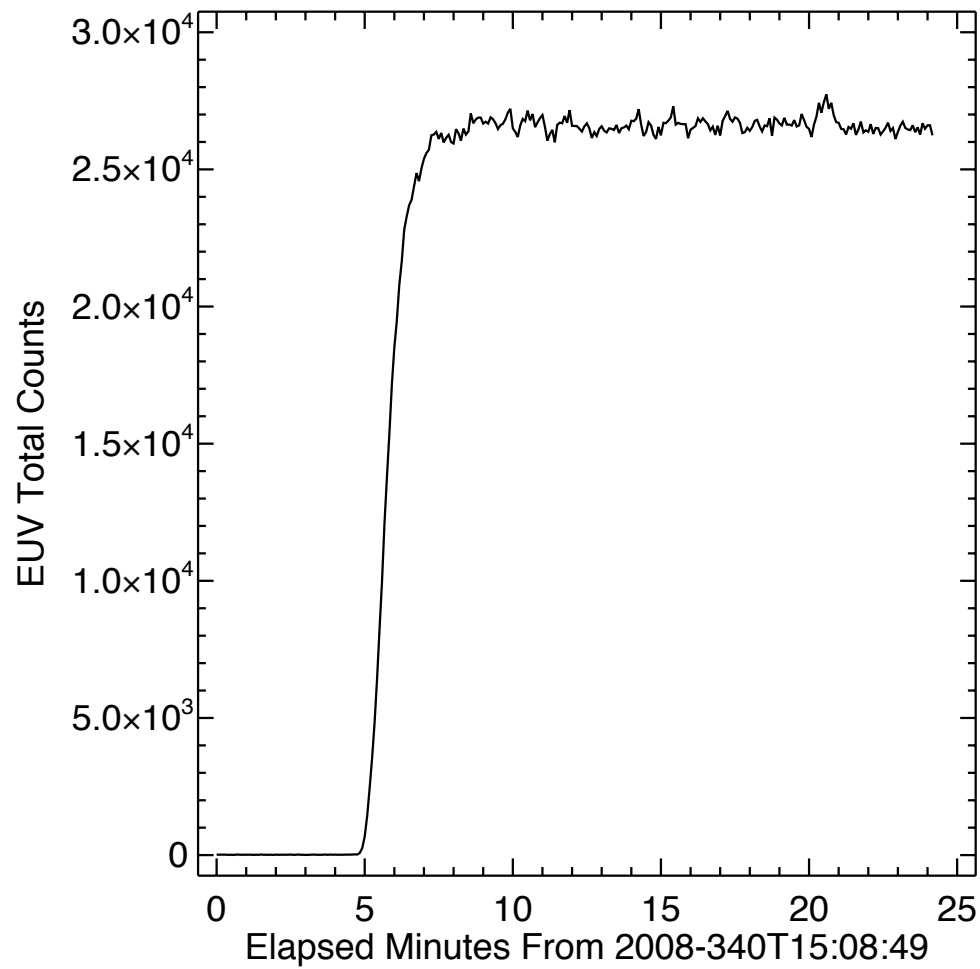
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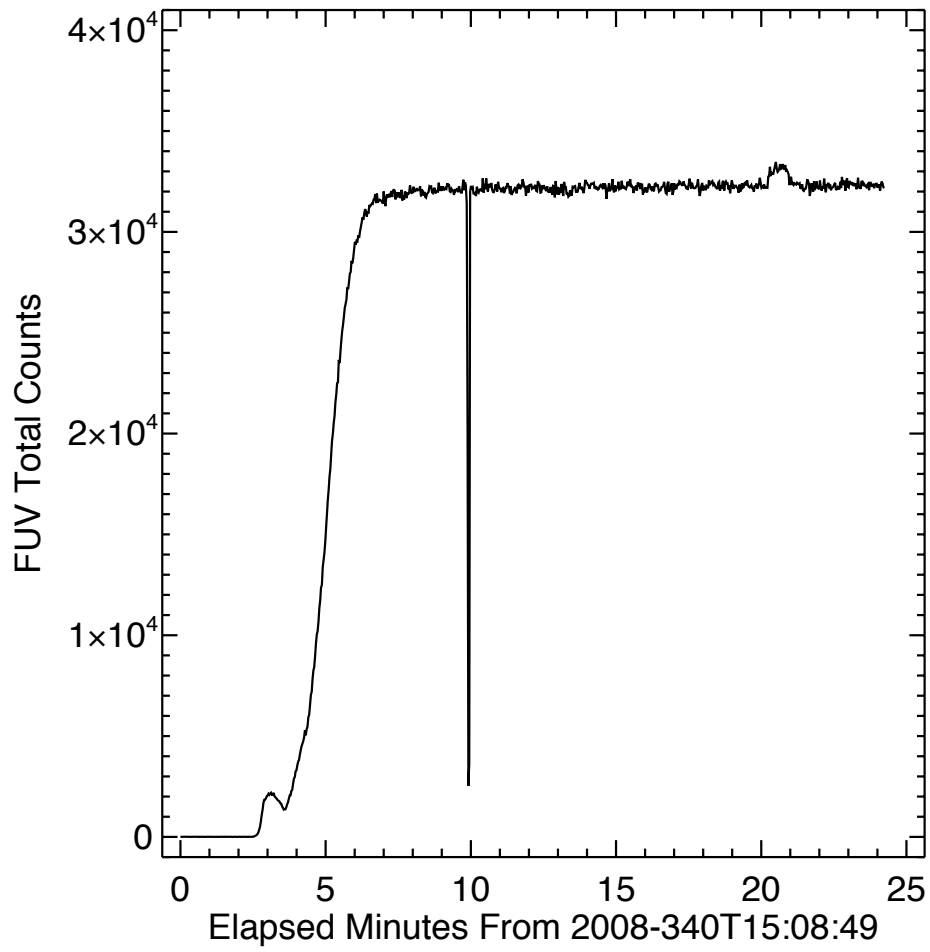
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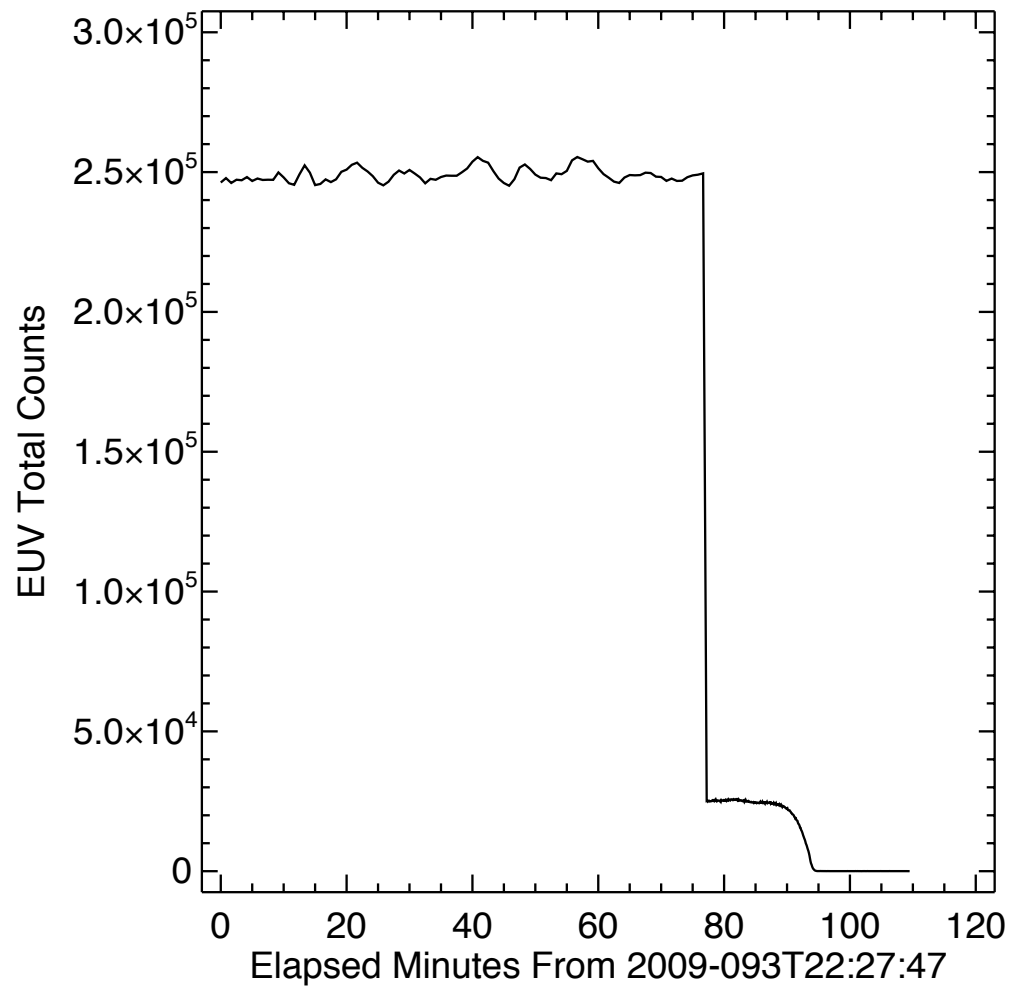
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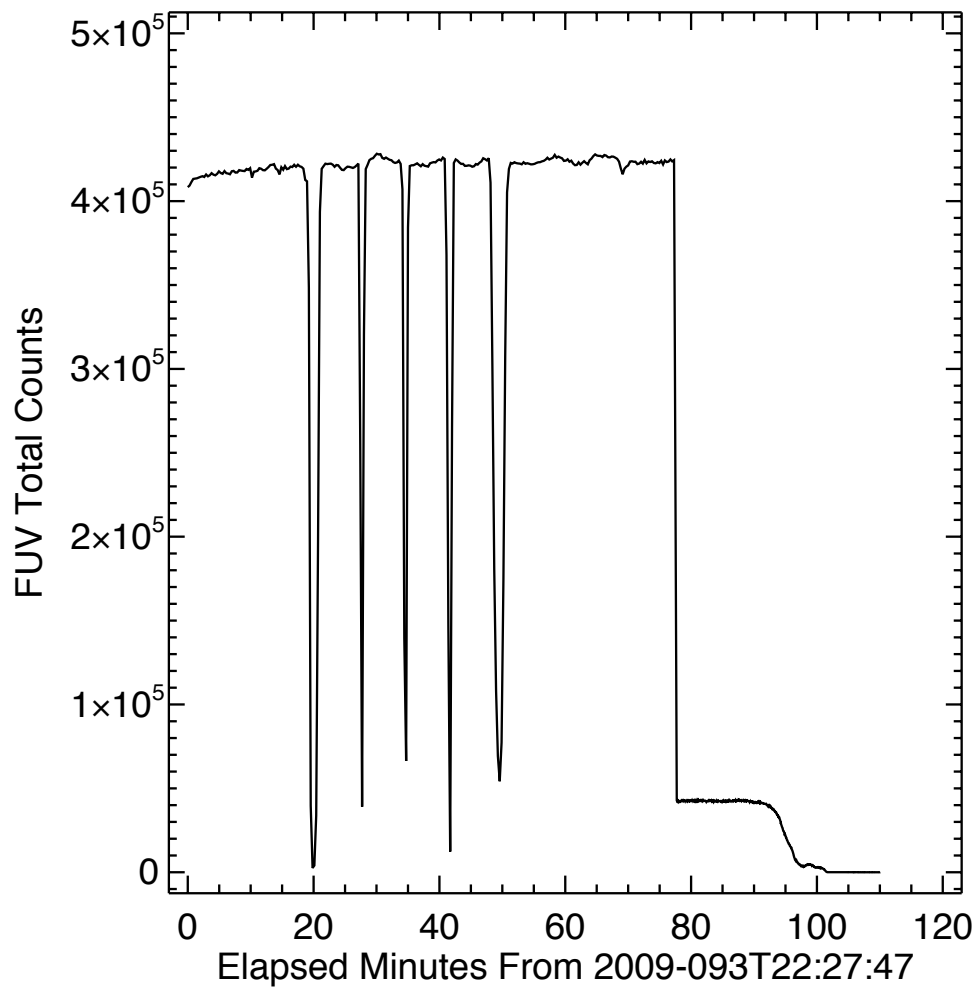
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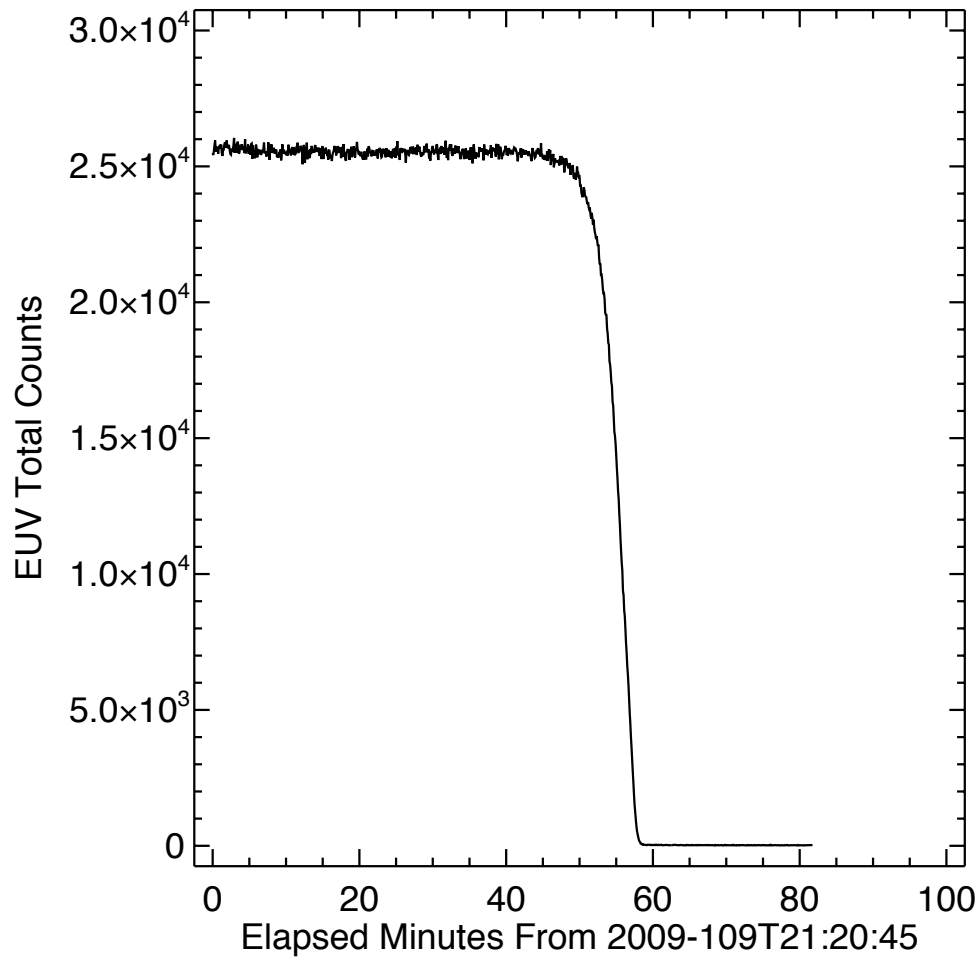
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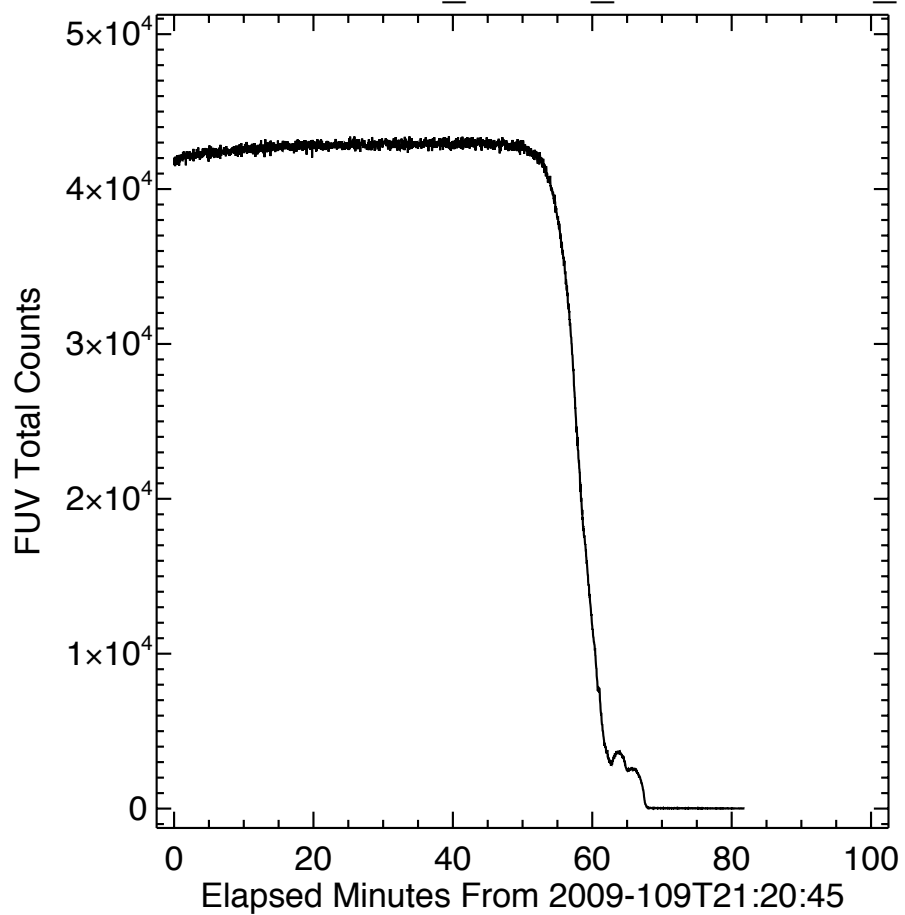
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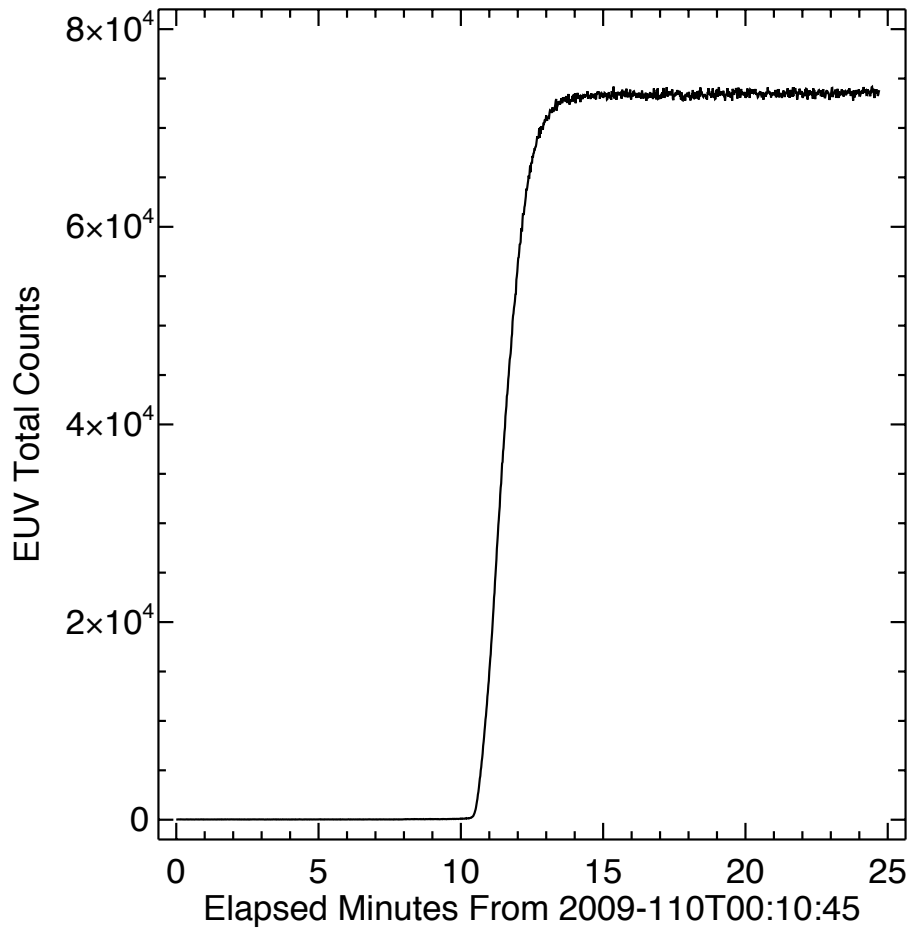
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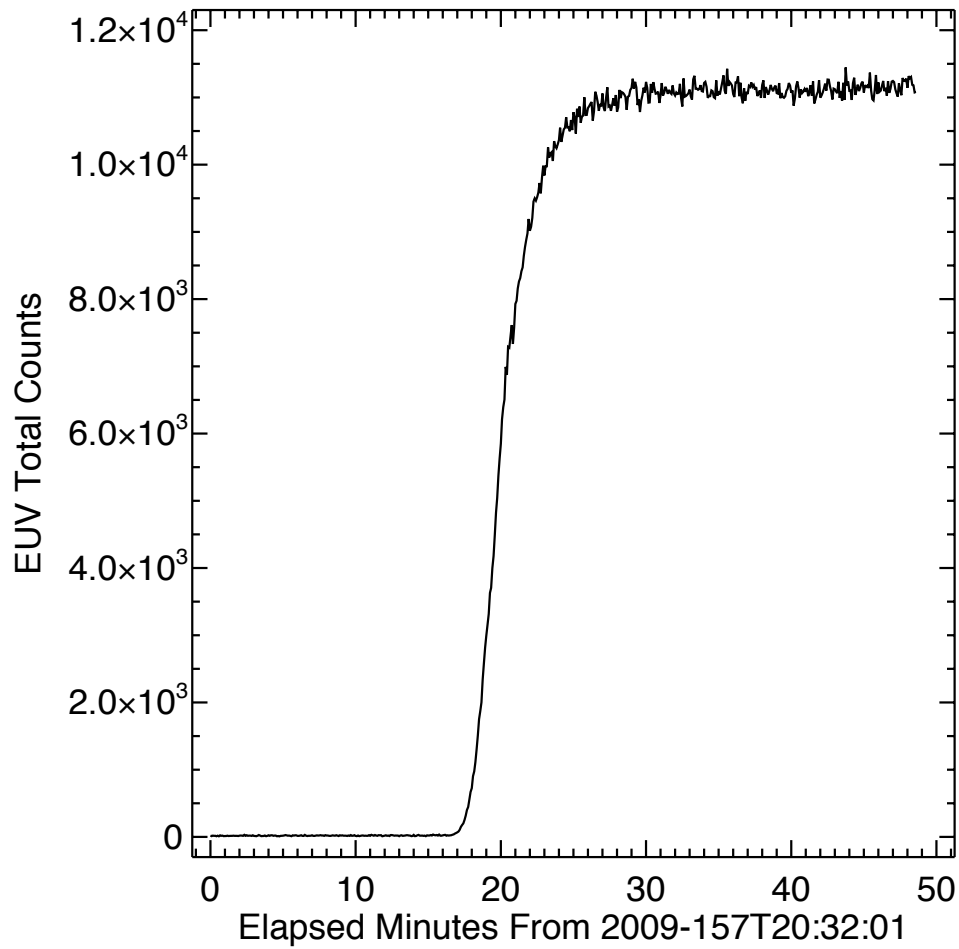
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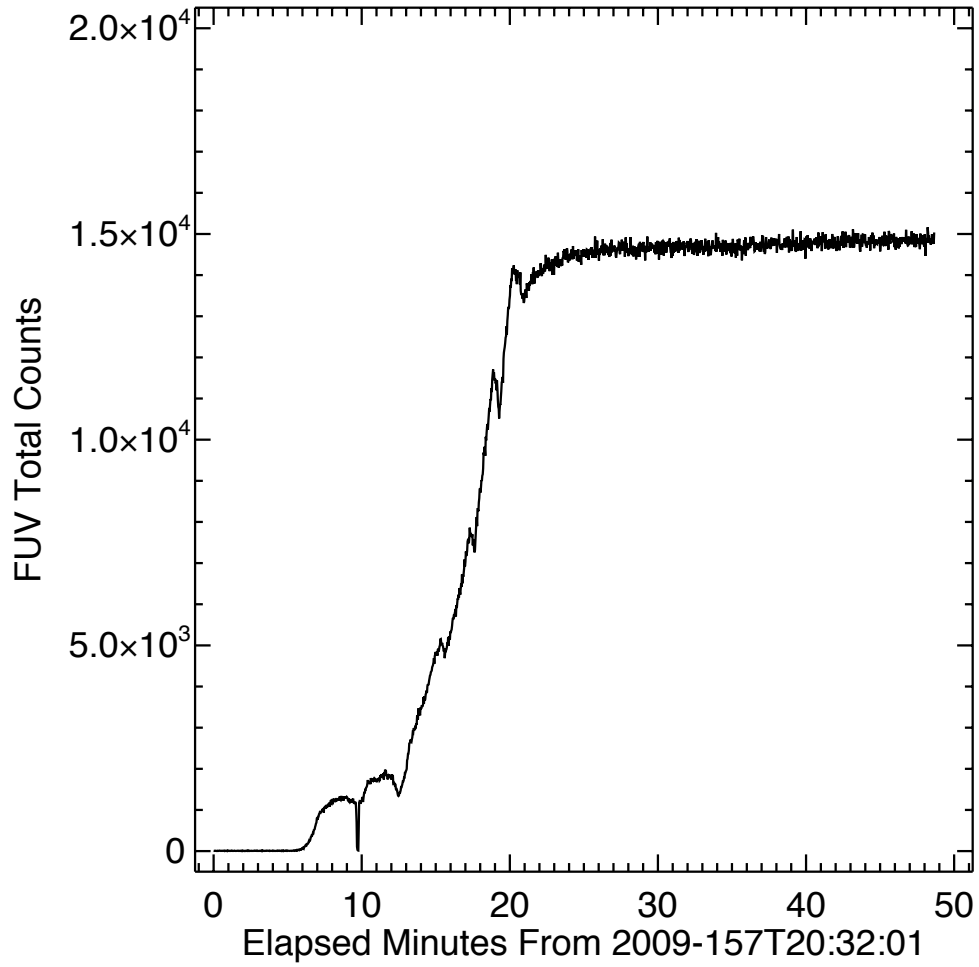
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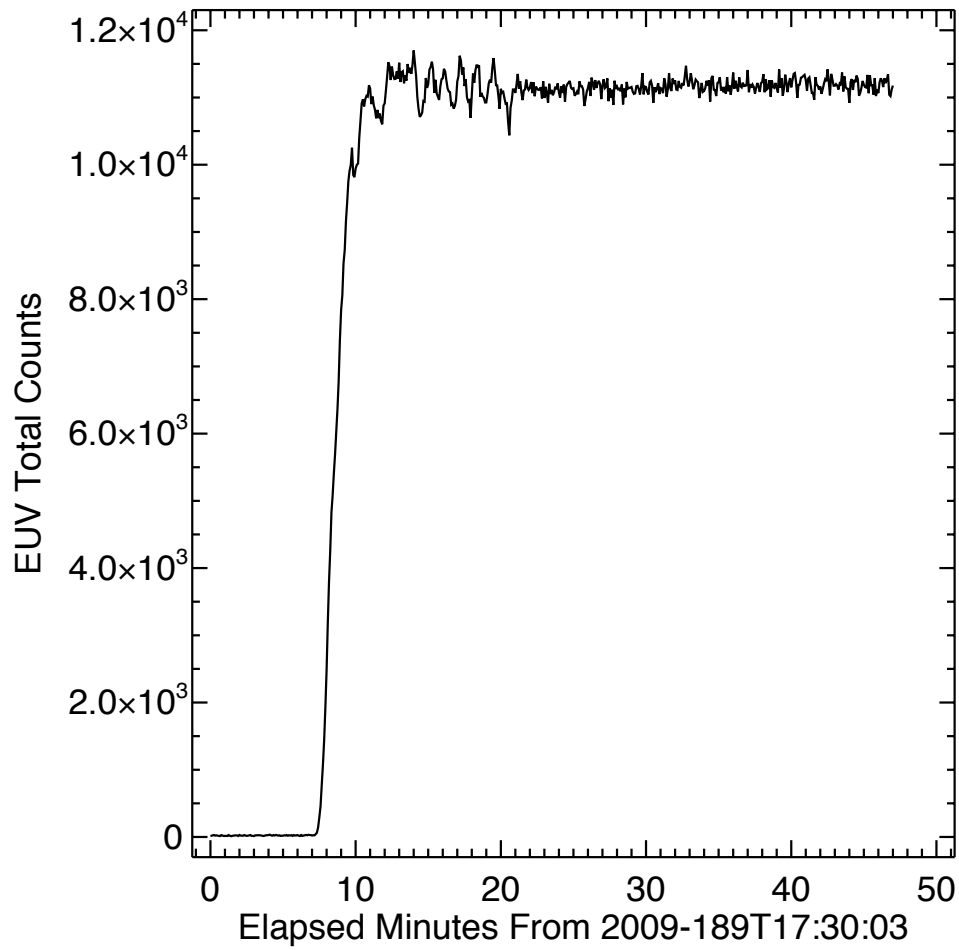
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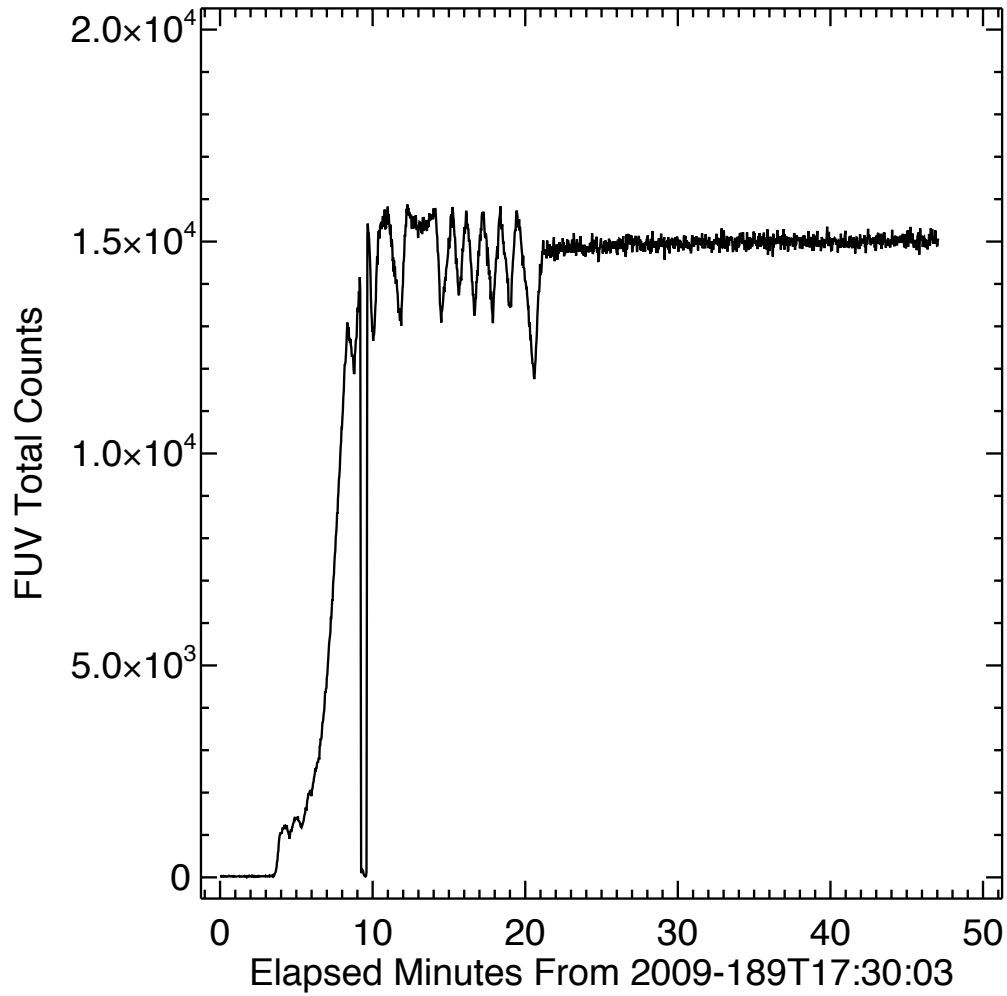
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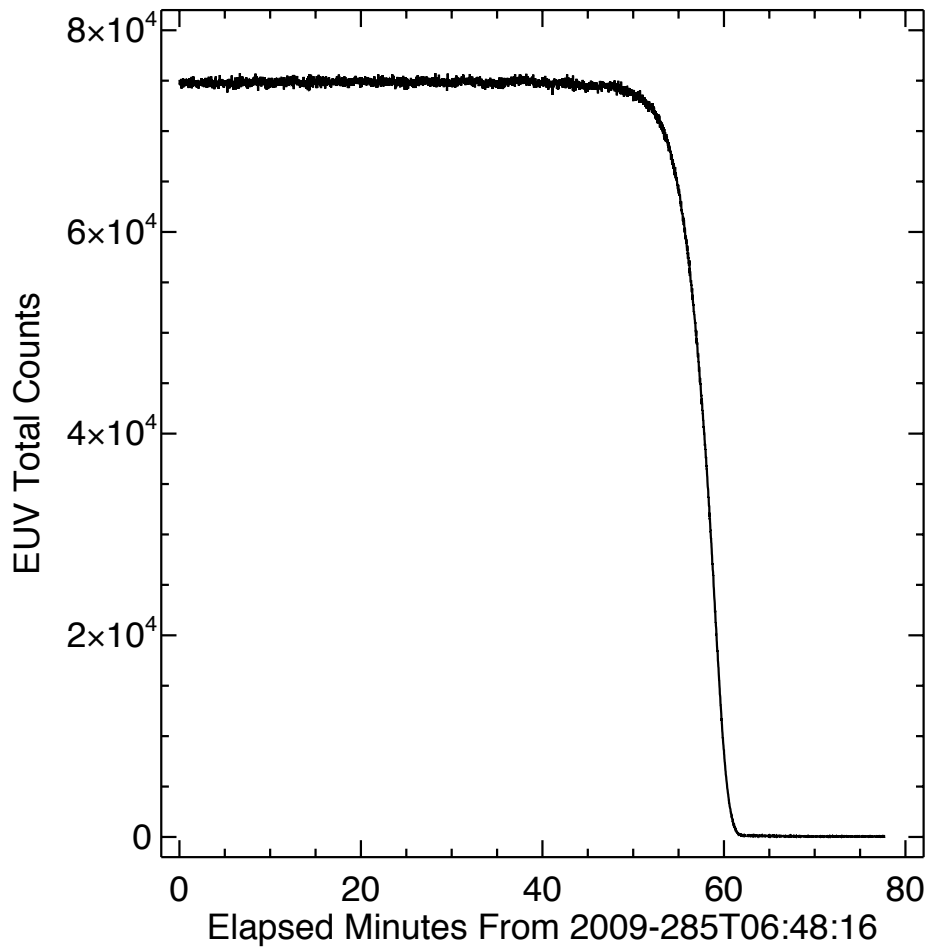
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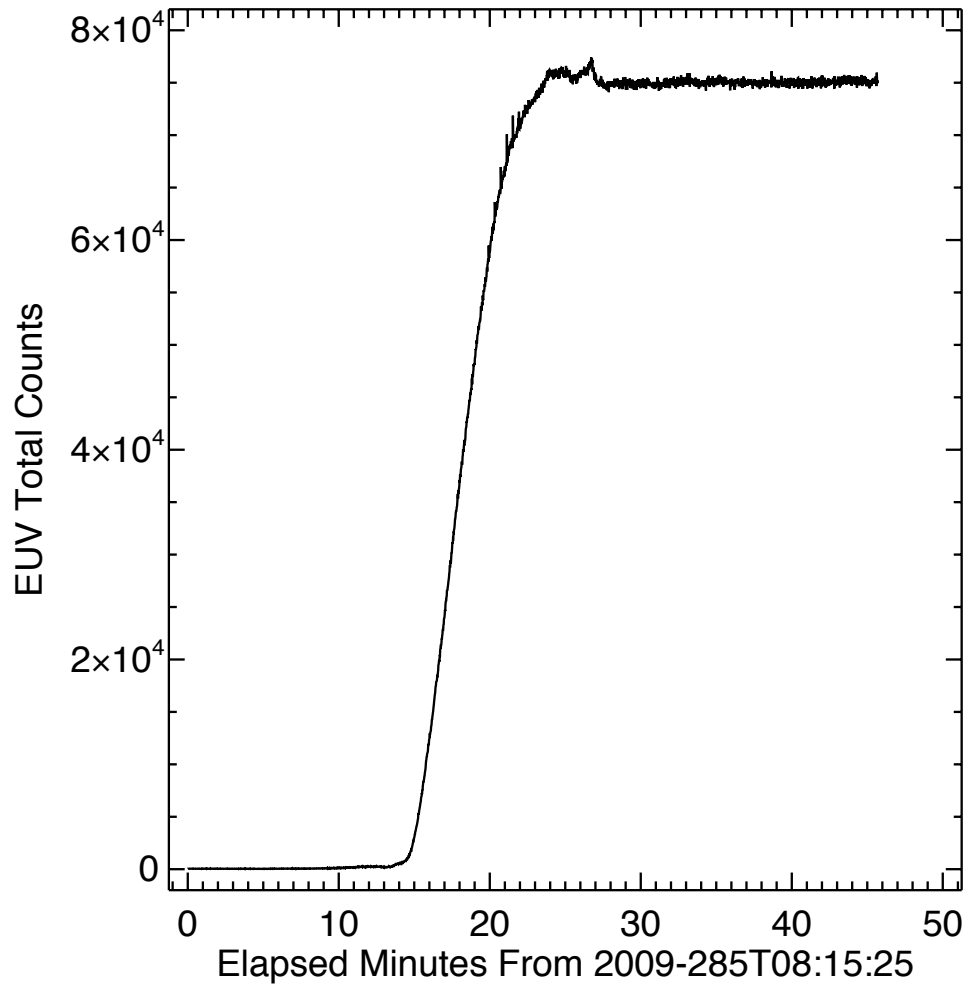
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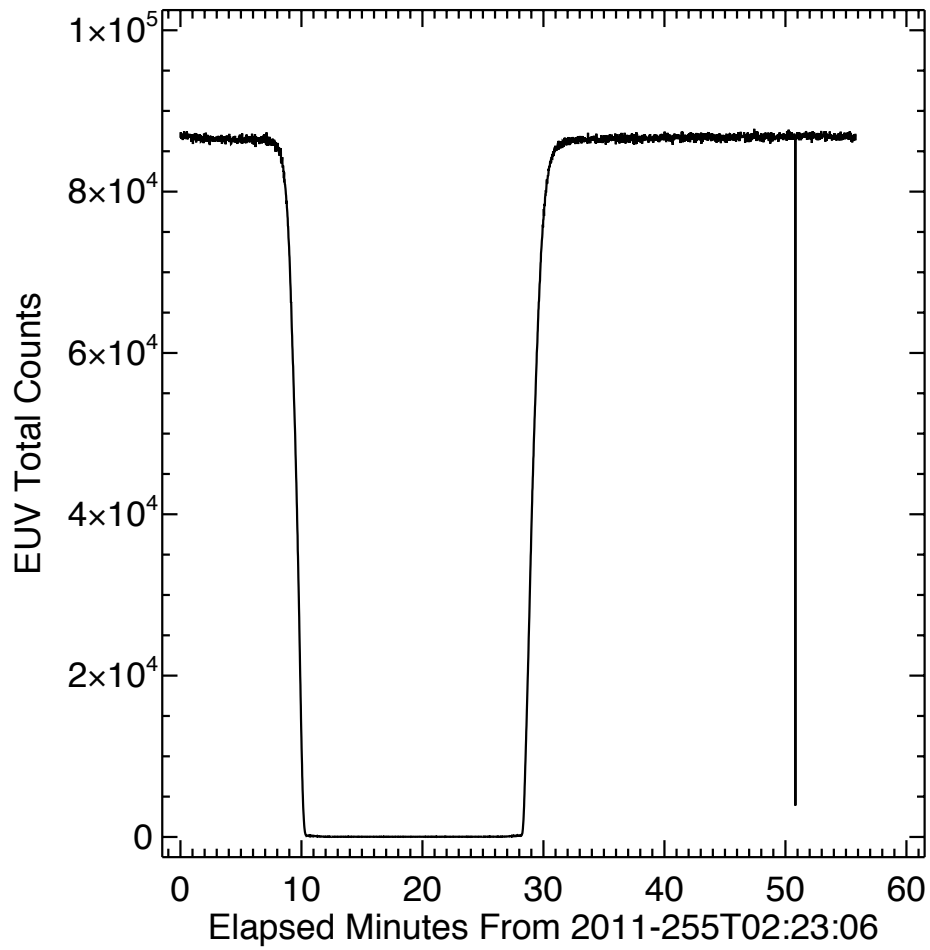
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Titan Occultation UVIS_119SU_USUNOCC002_PRIME



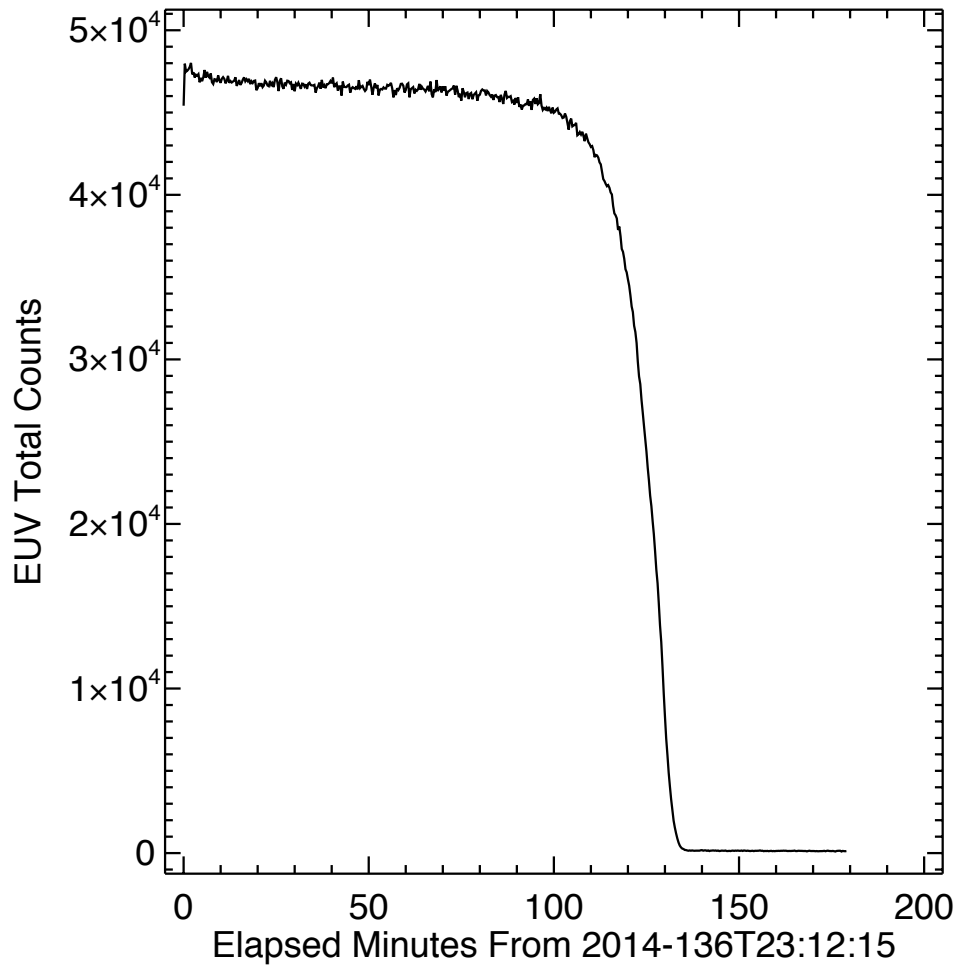
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Titan Occultation UVIS_153SU_USUNOCC001_PRIME



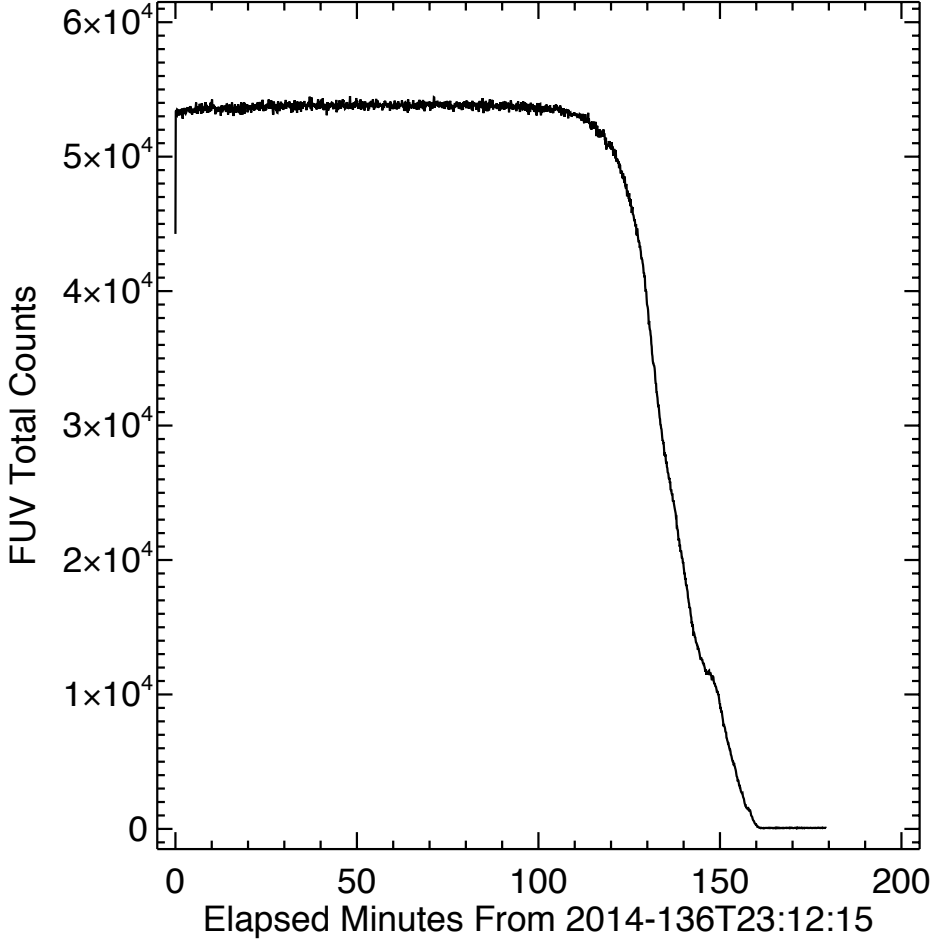
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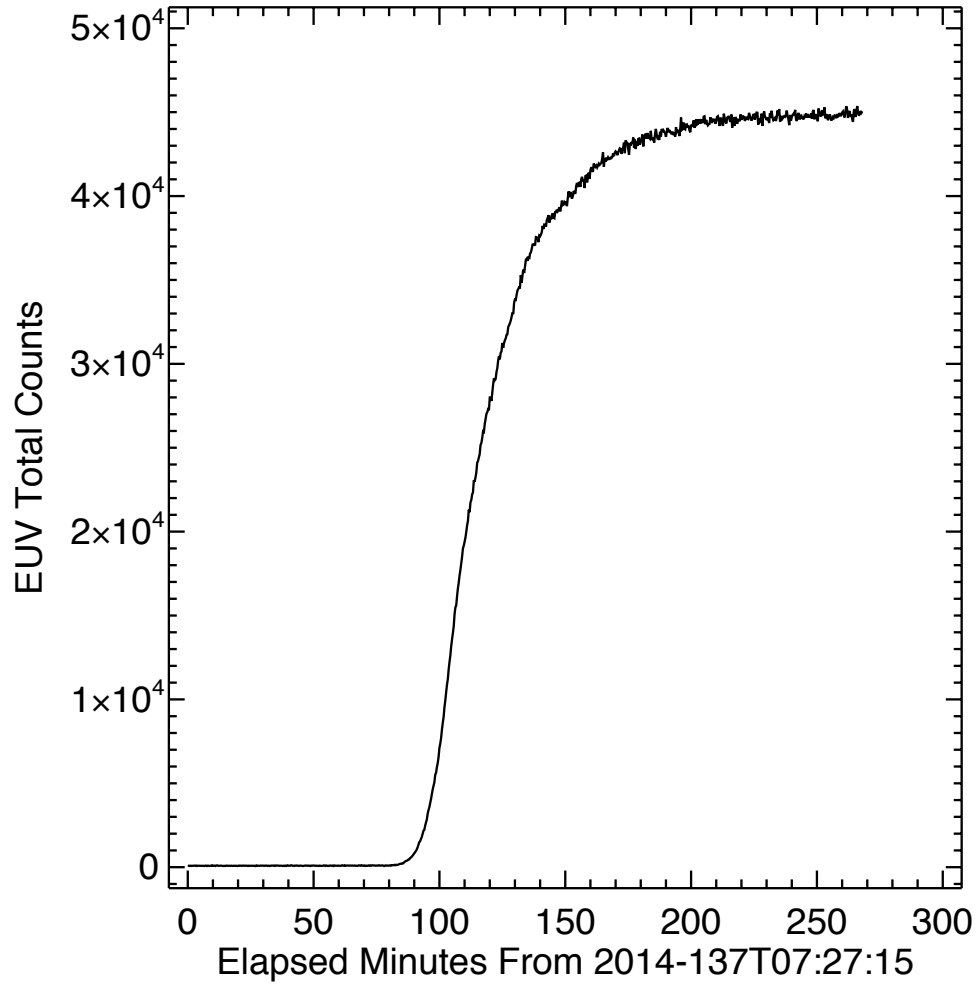
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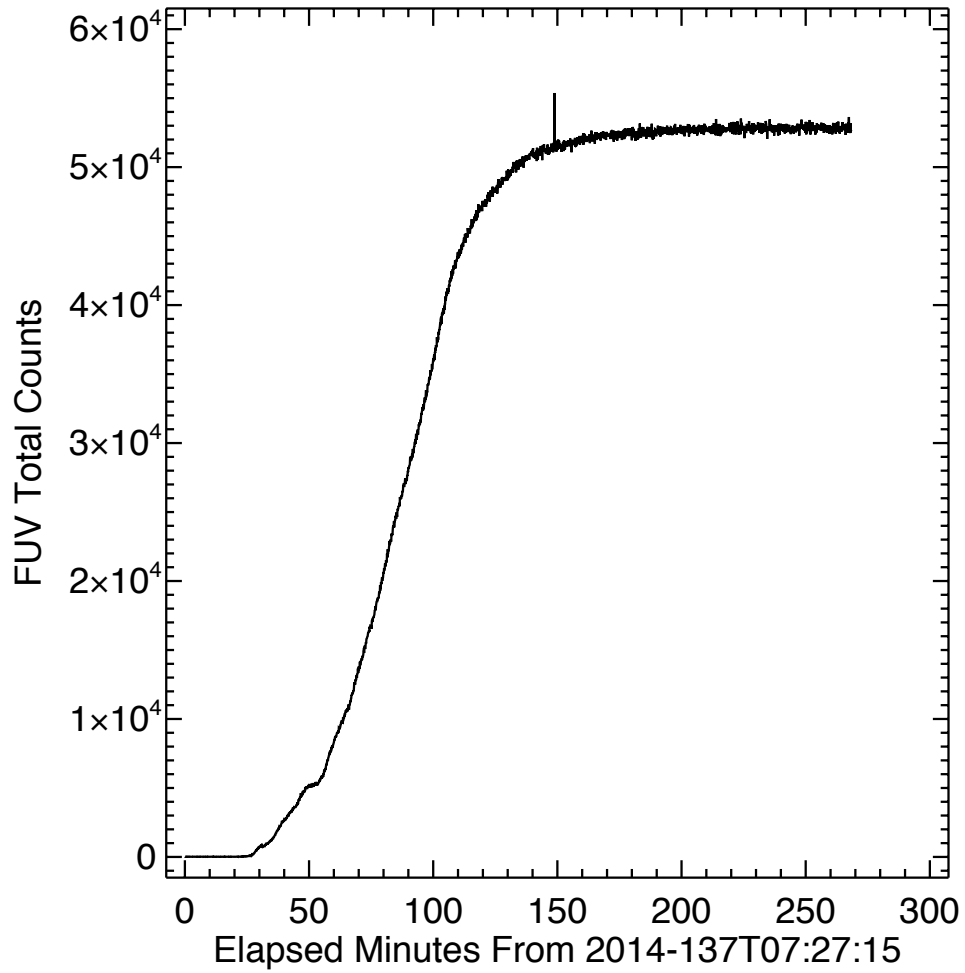
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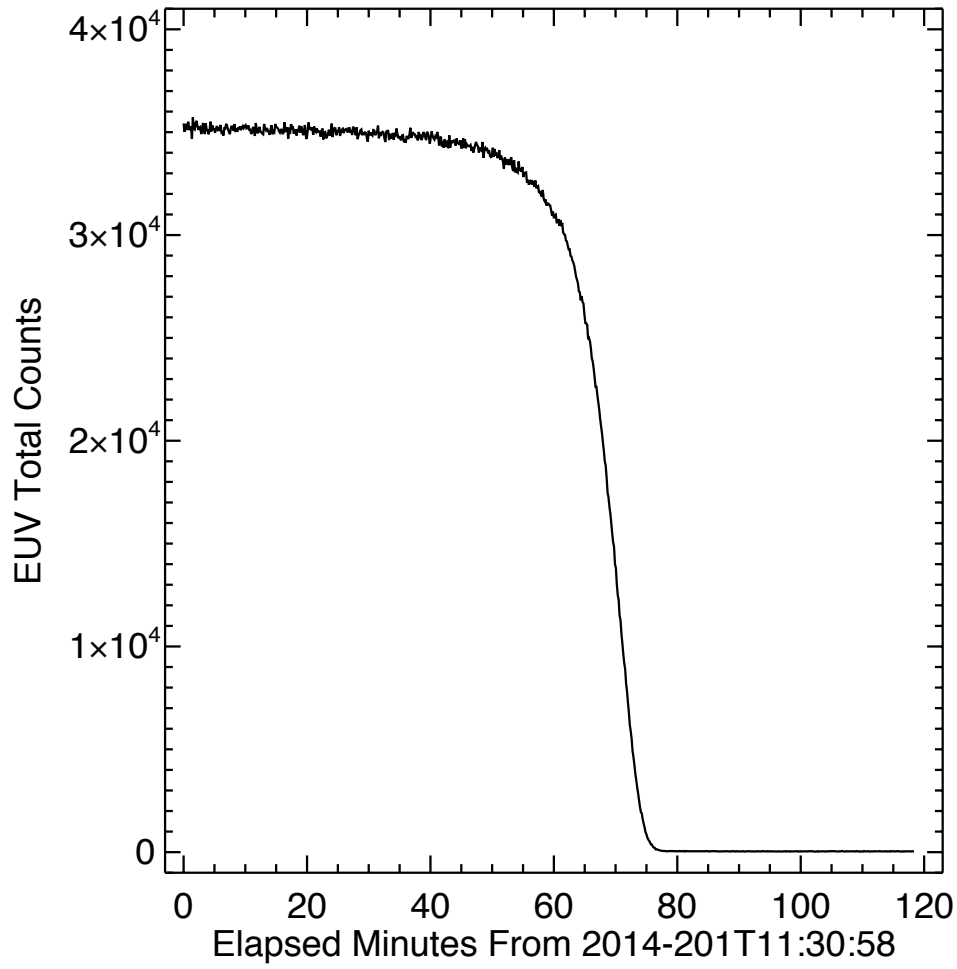
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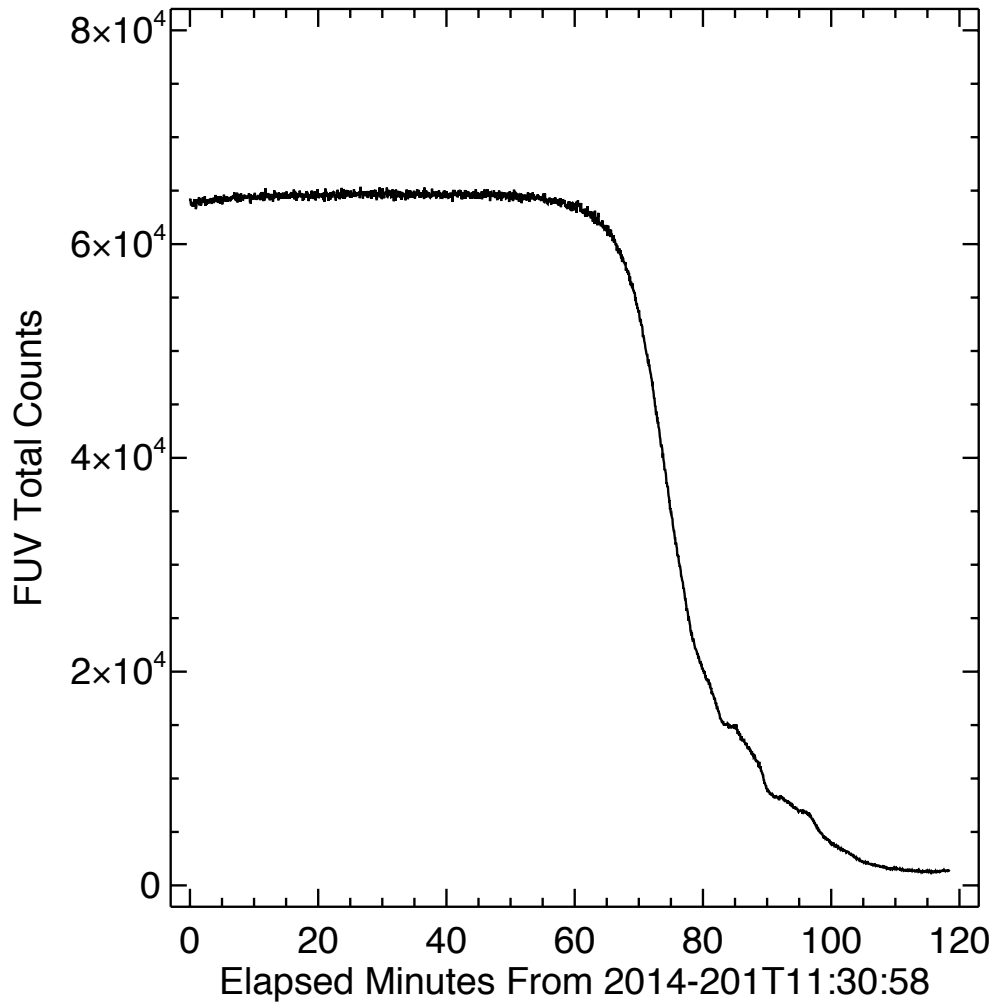
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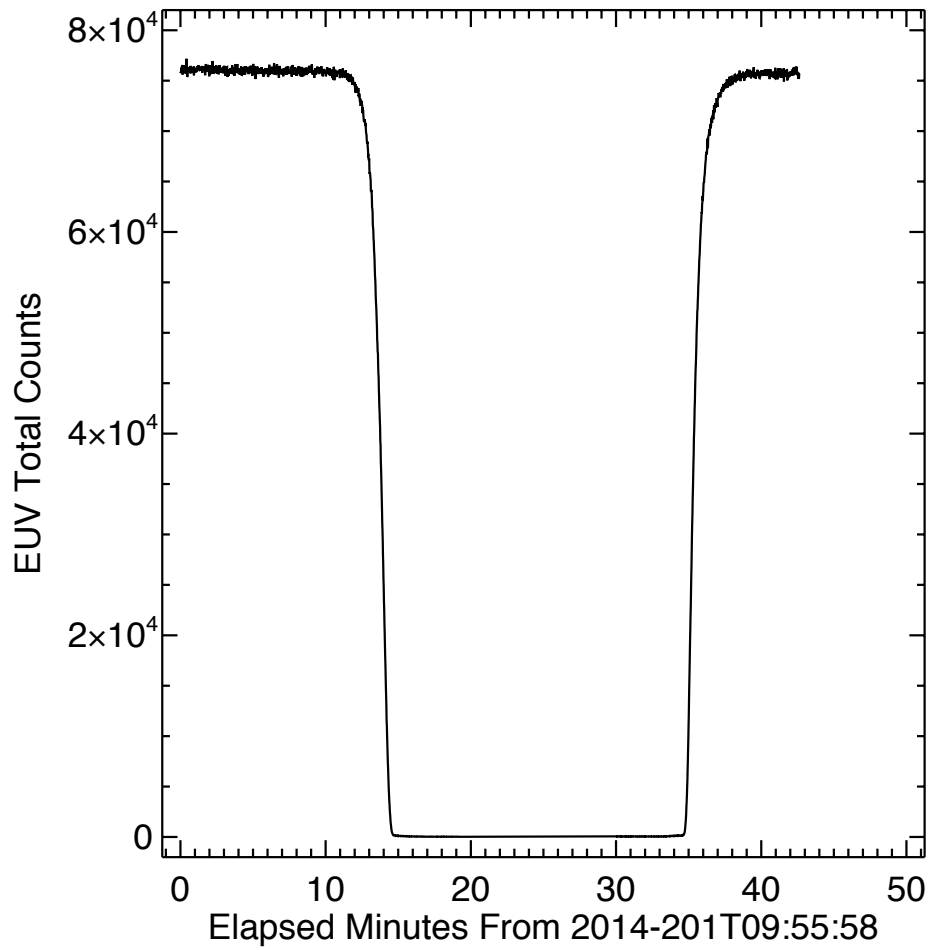
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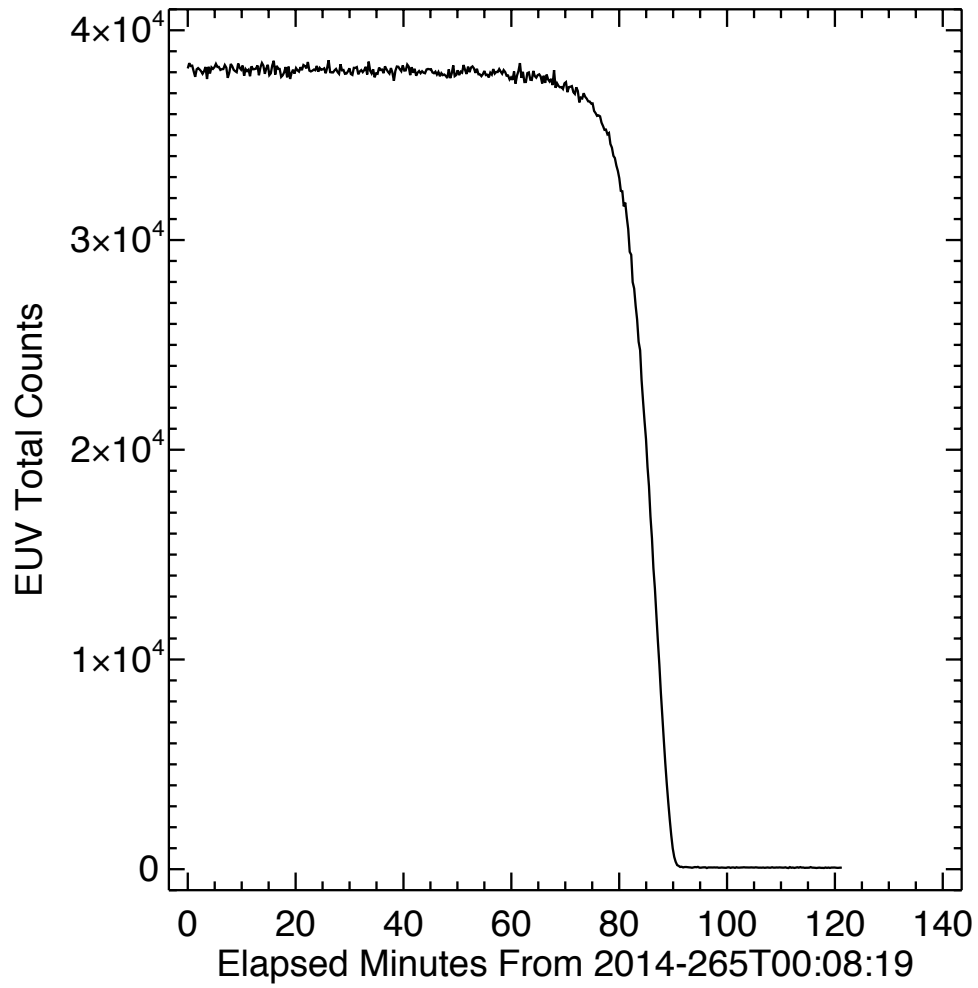
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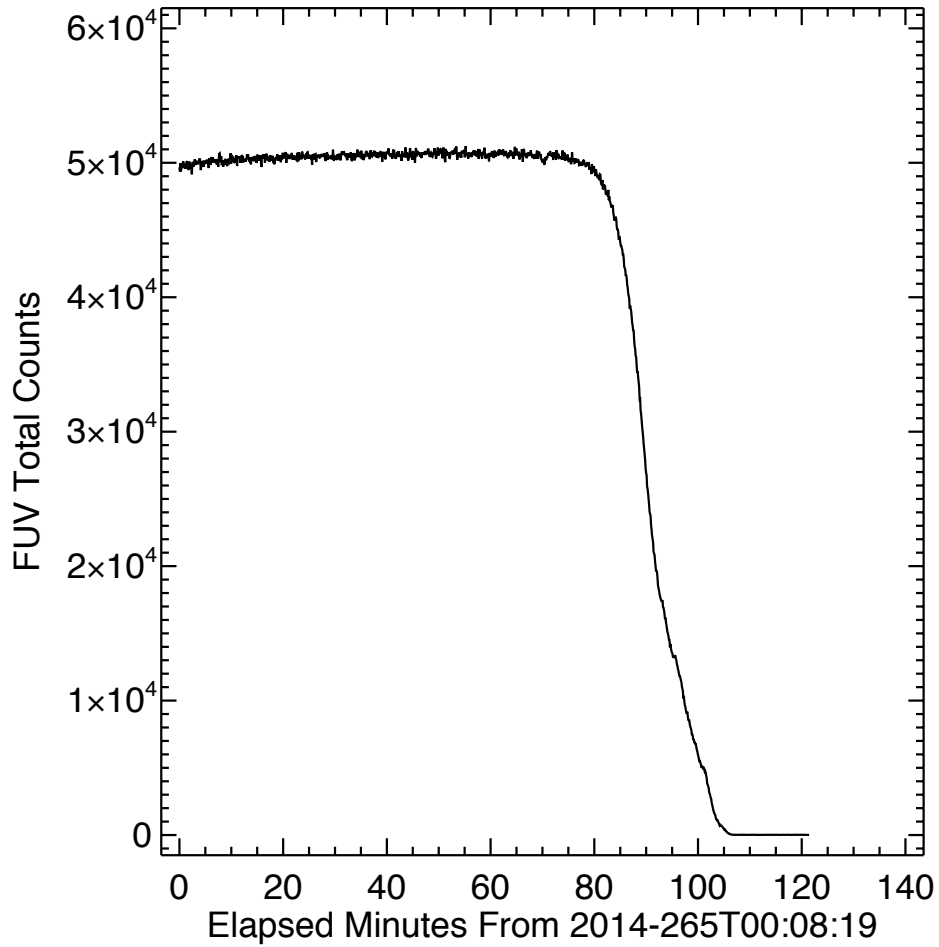
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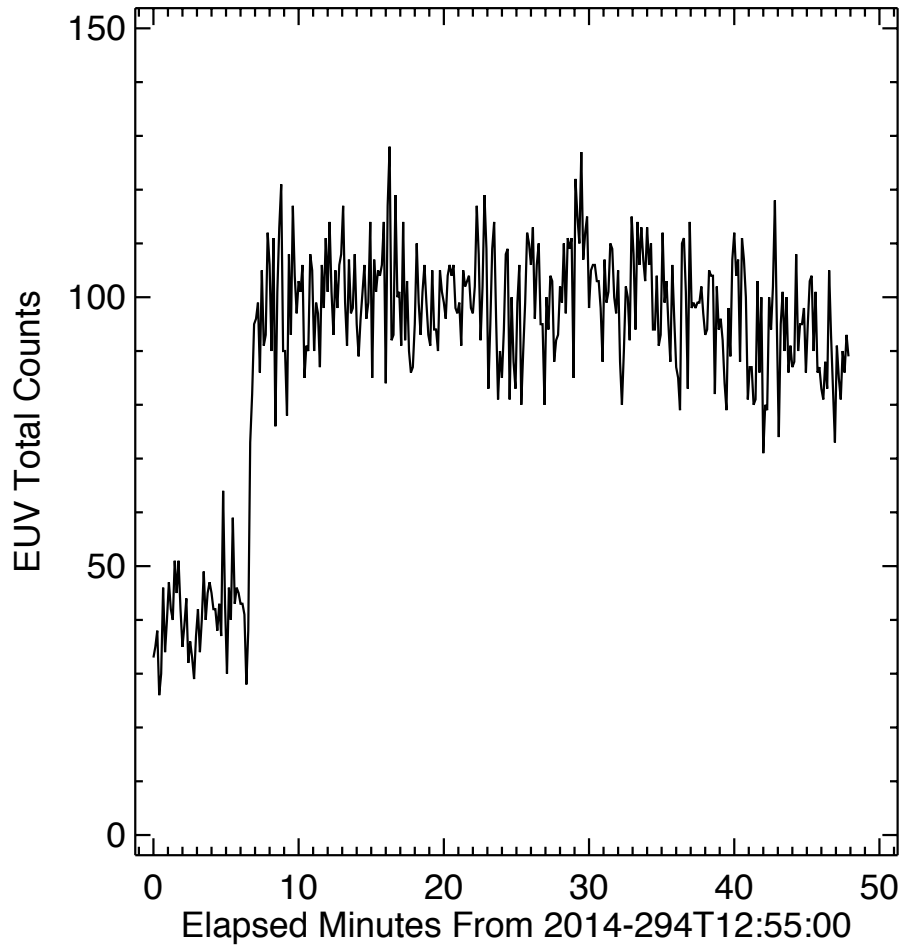
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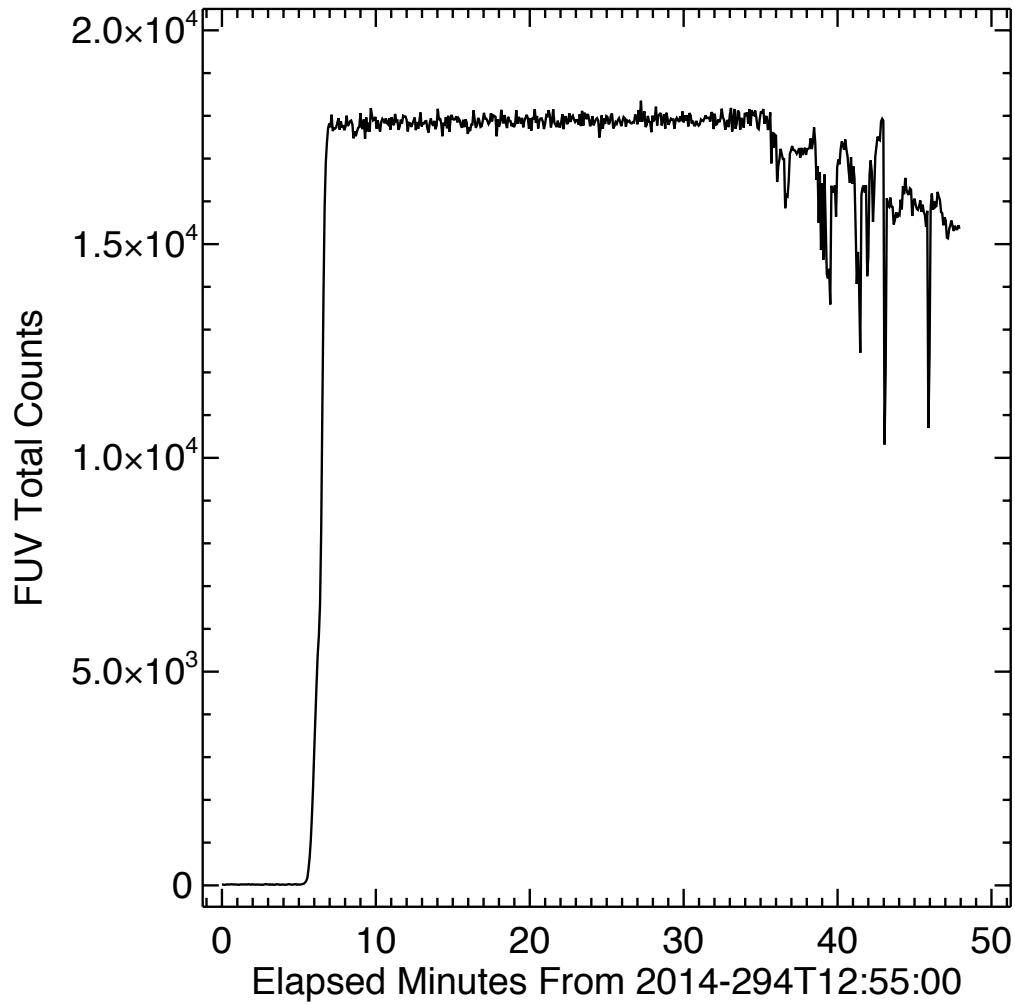
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Titan Occultation UVIS_209ST_ALPLYR001_PRIME



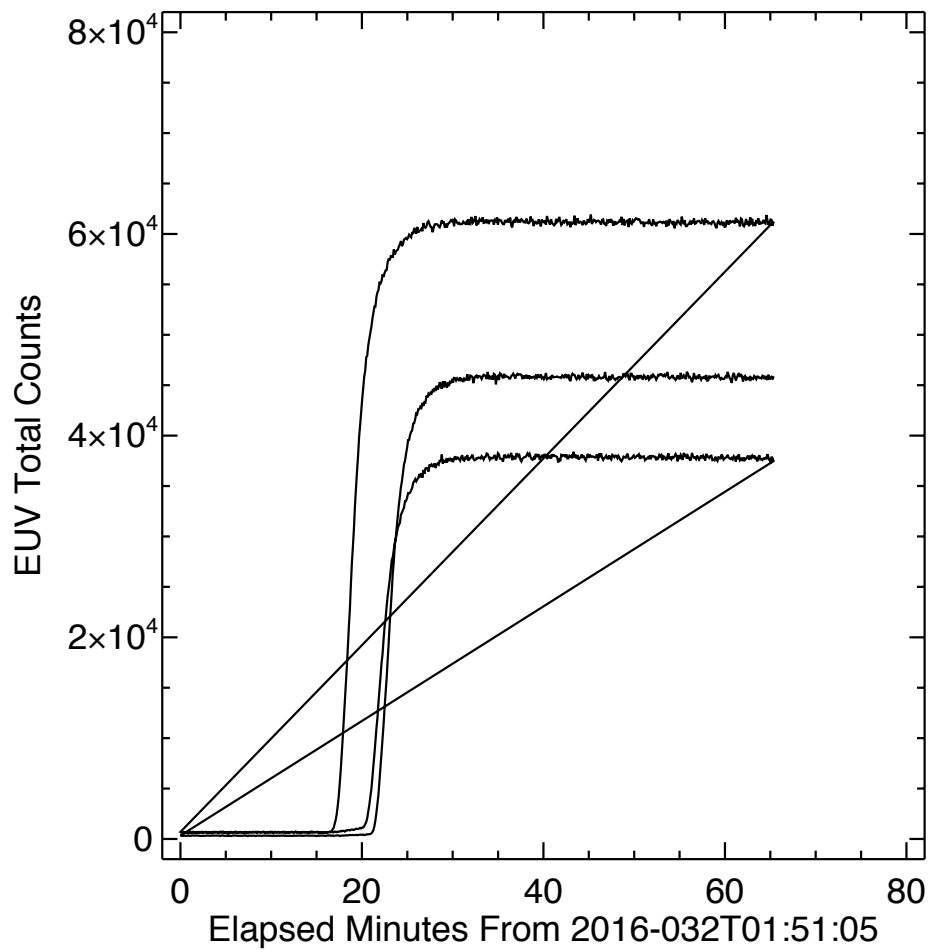
UVIS_209ST_ALPLYR001_PRIME

Titan Occultation UVIS_209ST_ALPLYR001_PRIME



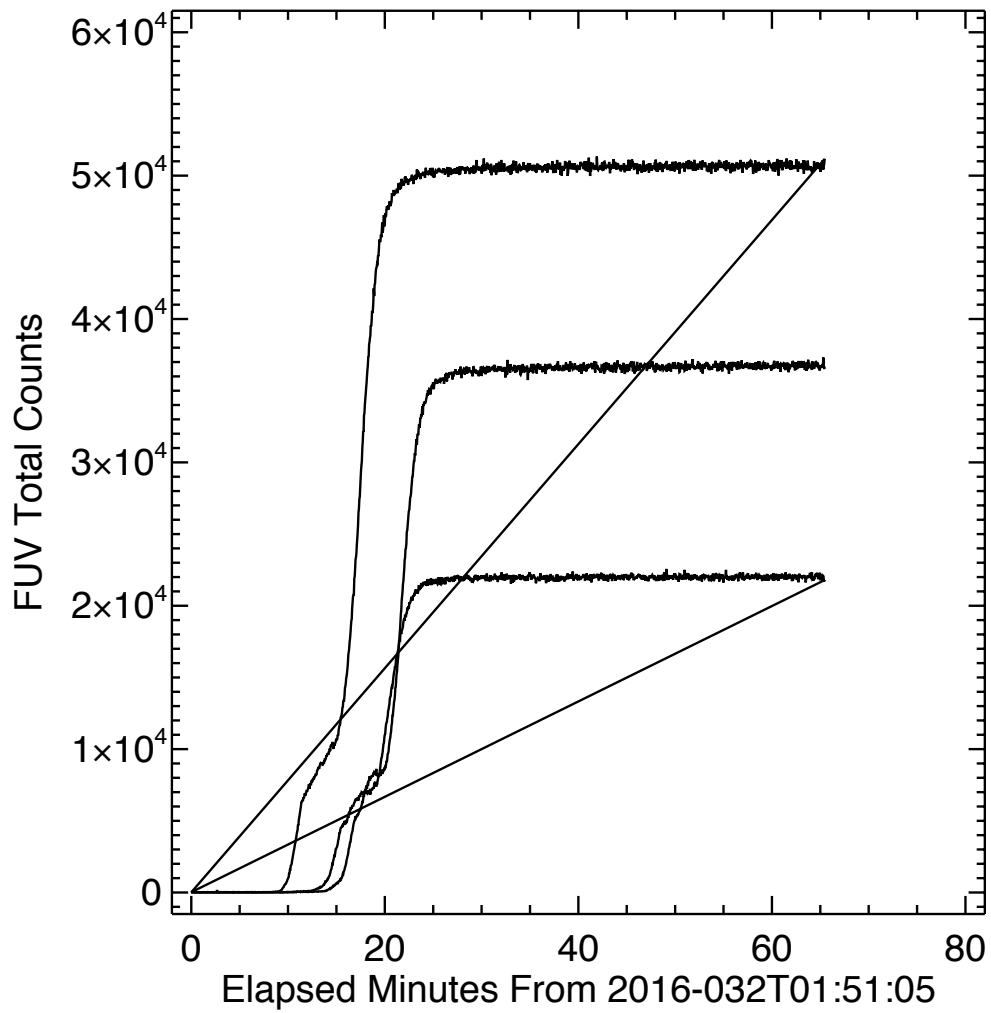
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Titan Occultation UVIS_231ST_EPSORI001_PRIME



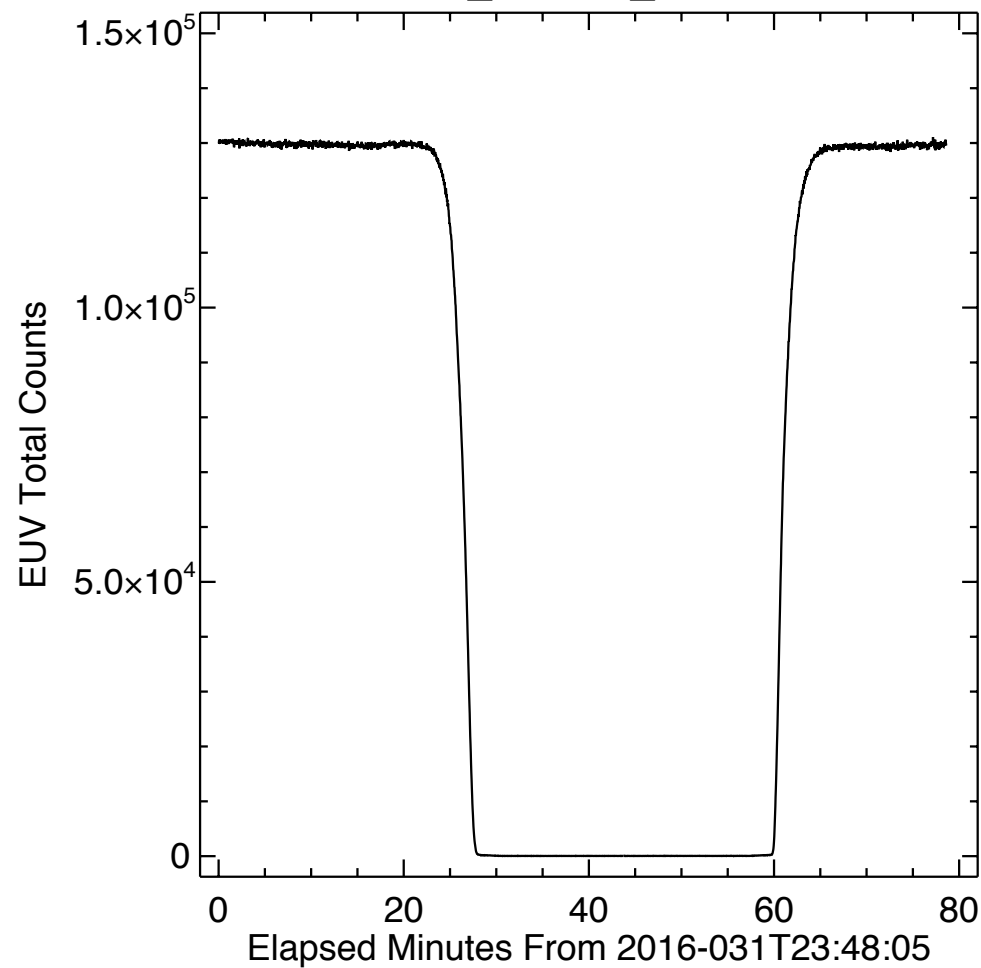
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Titan Occultation UVIS_231ST_EPSORI001_PRIME



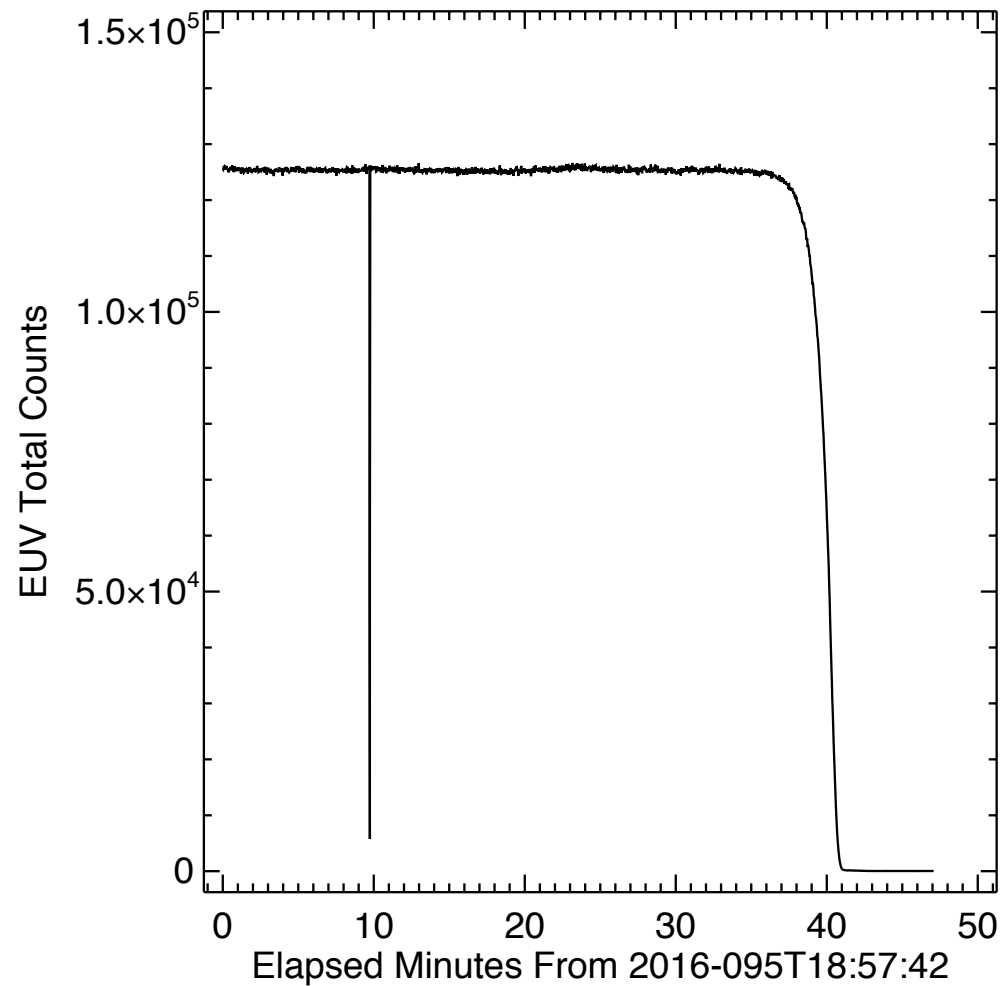
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Titan Occultation UVIS_231SU_UTISUNOCC001_PRIME



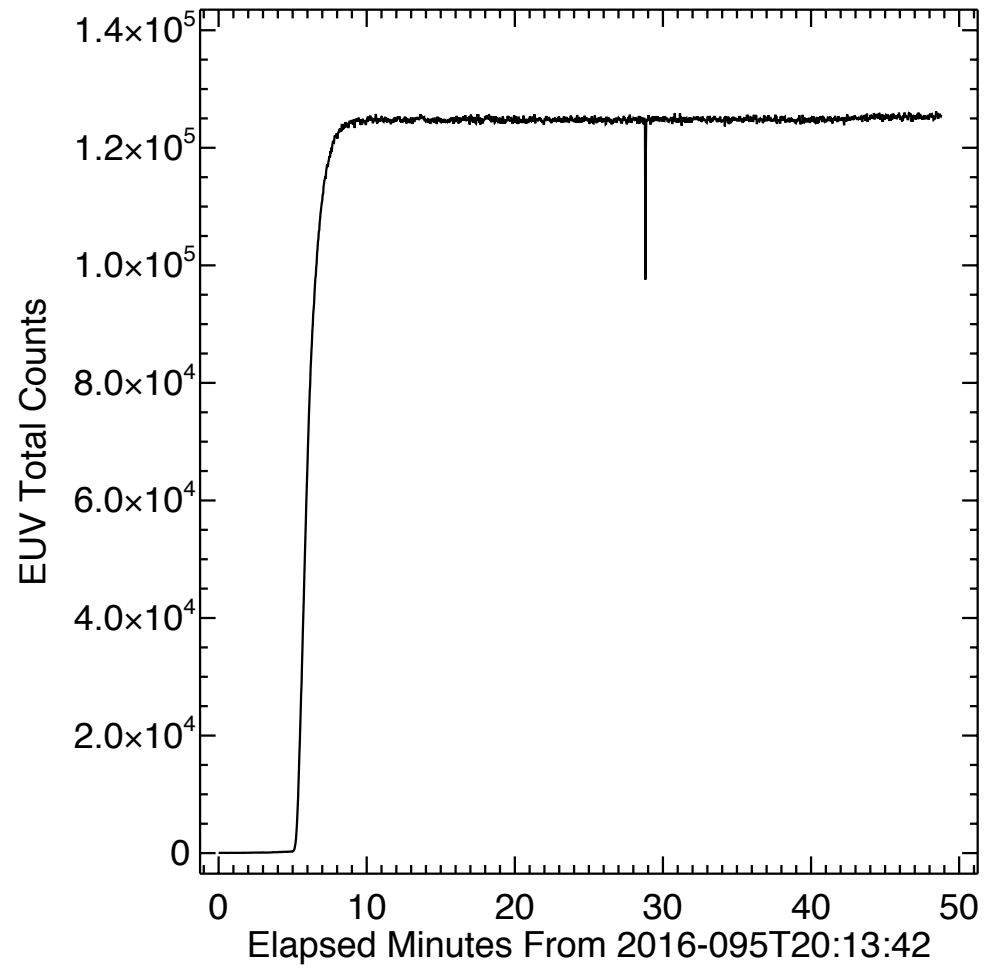
UVIS_231SU_UTISUNOCC001_PRIME

Titan Occultation UVIS_234SU_UTISUNOCC001_PRIME



UVIS_234SU_UTISUNOCC005_PRIME

Titan Occultation UVIS_234SU_UTISUNOCC006_PRIME



UVIS_234SU_UTISUNOCC006_PRIME