Proposal 17318 (STScI Edit Number: 1, Created: Wednesday, May 29, 2024 at 1:00:15 PM Eastern Standard Time) - Overview



# 17318 - Cycle 31 COS NUV MAMA Fold Distribution

Cycle: 31, Proposal Category: CAL/COS (Availability Mode: RESTRICTED)

#### INVESTIGATORS

Name	Institution		
Mr. Thomas Wheeler (PI) (Contact)	Space Telescope Science Institute		
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#### VISITS

Visit	Targets used in Visit	Configurations used in Visit	Orbits Used		OP Current with Visit?
01	DARK DEUTERIUM	COS/NUV S/C	1	29-May-2024 14:00:15.0	yes
51	DARK DEUTERIUM	COS/NUV S/C	1	29-May-2024 14:00:15.0	yes

2 Total Orbits Used

### ABSTRACT

The performance of the MAMA microchannel plate can be monitored using a MAMA fold analysis procedure. The fold analysis provides a measurement of the distribution of charge cloud sizes incident upon the anode giving some measure of changes in the pulse-height distribution of the MCP and, therefore, MCP gain. This proposal executes the same steps as Cycle 30, Proposal 16936.

#### **OBSERVING DESCRIPTION**

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The proposal nomenclature for the various anode fold configurations is: C2 = Column 2, R2 = Row 2, C3 = Column 3, R3 = Row 3, C4 = Column 4, R4 = Row 4, C5 = Column 5, R5 = Row 5, C6 = Column 6, and R6 = Row 6. The fold analysis is initiated by selecting the grating/lamp combination appropriate for the test. The following steps are then executed: Select the count rate monitor and collect 60 seconds of data; Repeat this for each of the count rate monitors W, X, Y, Z, OR, EV, VE; Disable all of the selectable folds (C2, C3, C4, C5, C6, R2, R3, R4, R5, R6); Collect 60 seconds of VE with folds C2, R2 enabled, other folds disabled; Collect 60 seconds of VE with folds C2, R3 enabled, other folds disabled; Collect 60 seconds of VE with folds C3, R2 enabled, other folds disabled; Collect 60 seconds of VE with folds C2, R4 enabled, other folds disabled; Collect 60 seconds of VE with folds C3, R3 enabled, other folds disabled; Collect 60 seconds of VE with folds C4, R2 enabled, other folds disabled; Collect 60 seconds of VE with folds C3, R4 enabled, other folds disabled; Collect 60 seconds of VE with folds C4, R3 enabled, other folds disabled; Collect 60 seconds of VE with folds C3, R5 enabled, other folds disabled; Collect 60 seconds of VE with folds C4, R4 enabled, other folds disabled; Collect 60 seconds of VE with folds C5, R3 enabled, other folds disabled; Collect 60 seconds of VE with folds C4, R5 enabled, other folds disabled; Collect 60 seconds of VE with folds C5, R4 enabled, other folds disabled; Collect 60 seconds of VE with folds C4, R6 enabled, other folds disabled; Collect 60 seconds of VE with folds C5, R5 enabled, other folds disabled; Collect 60 seconds of VE with folds C6, R4 enabled, other folds disabled; Collect 60 seconds of VE with folds C5, R6 enabled, other folds disabled; Collect 60 seconds of VE with folds C6, R5 enabled, other folds disabled; Collect 60 seconds of VE with folds C6, R6 enabled, other folds disabled; Enable all selectable folds (C2, C3, C4, C5, C6, R2, R3, R4, R5, R6);

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Collect 60 seconds of EV and 5 samples of VE counts to measure any lamp drift;

Turn off the lamp;

Select the W count rate monitor and collect 60 seconds of data for the dark rate;

Repeat this for each of the other count rate monitors (X, Y, Z, OR, EV, and EV);

Restore the global monitor to its normal value.

Analysis of the data is performed by creating a histogram binned by the sums of the fold numbers for columns and rows:

C2R2 = 4 folds C2R3 + C3R2 = 5 folds C2R4 + C3R3 + C4R2 = 6 folds C3R4 + C4R3 = 7 folds C3R5 + C4R4 + C5R3 = 8 folds C4R5 + C5R4 = 9 folds C4R6 + C5R5 + C6R4 = 10 folds C5R6 + C6R5 = 11 folds C6R6 = 12 foldsThe sum of the 4 to 12 folds is equal to VE. The

The sum of the 4 to 12 folds is equal to VE. The total number of events >= 4 folds is EV. The number of events greater than 12 folds is EV-VE. Generate a plot of 4 fold/EV, 5 fold/EV through 12 fold/EV, with (EV-VE)/EV on the abscissa and with the ordinate labeled 4 fold, 5 fold... 12 fold.

Results are sent to the COS Science Team and Steve Franka of Ball Aerospace <sfranka@ball.com>.

----- Additional Comments ------

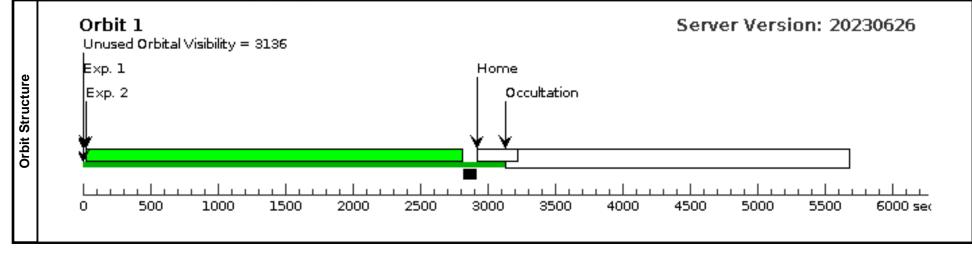
Bright Object Protection Considerations. During the execution of the fold analysis some anode folds are disabled. Consequently, the OR counter does not provide a true representation of the OR count and so the Software Global Monitor (SGM) does not trigger until the enabled folds provide enough counts to the OR counter to trigger the SGM's threshold. To compensate, while the fold analysis is running the SGM threshold is reduced to 100,000 counts in a 1.0 second interval, from its nominal value of 20,000 counts in a 0.1 second interval.

Proposal 17318 (STScI Edit Number: 1, Created: Wednesday, May 29, 2024 at 1:00:15 PM Eastern Standard Time) - Overview This test should only be run with the COS extenal shutter closed.

Special Commanding is used in this proposal.

### Proposal 17318 - NUV Fold Test (01) - Cycle 31 COS NUV MAMA Fold Distribution

	Pro	posal 17318, N	NUV Fold Test (01),	failed					Wed May 29 18:00:15	GMT 2024
	Diagnostic Status: Warning									
Visit	Scientific Instruments: S/C, COS/NUV									
>				MAY-2024:00:00:00 AND 01-JUN-2	024.00.00.00. PAR	AI I FI				
	-	-		fold analysis visit per year	024.00.00.00, I AKA					
6	-			Planner): MAXIMUM DURATION E	VCEEDED FOR IN	TEDNAL OD EADTHC				
Diagnostics			(Office)		ACCEPTED FOR IN	TERNAL OR EARTING	ALD SU			
	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	Fold Test Se	DARK	S/C, DATA, NONE			SAA CONTOUR 32:	Same Alignment in	20.0 Secs (20 Secs)	
		tup					SPEC COM INSTR	NUV Fold Test (01)	[==>]	(1)
							ELFOLDSET			[1]
	Com	nments: Specia	l setup for NUV Fold	l Analysis Test. Set the Software Glob	al Monitor to 15,000	ORCOUNTS per sec (su	efficient to allow for spi	ke at lamp turn-on).		
	2	Fold Test DEUTERIUM	1 COS/NUV, TIME-TAG, FCA	G185M	CURRENT=MEDIU	SPEC COM INSTR		2300.0 Secs (2300 Secs)		
					1850 A	М;	ELFOLDTST;	NUV Fold Test (01)	[==>]	
						BUFFER-TIME=27 00	QESIPARM TARG TYPE FOLD			[1]
Exposures	Set S (1) C	Software Globo Collect event d Disable MAMA Conduct fold at a) Enabled: C2 b) Enabled: C2	al monitor (SGM Thr ata during flat field it Folds: C2, C3, C4, nalysis. Collect one n	xposure commanding will issue a red reshold = 10,000, SGM Integration pe llumination. Collect 60 sec. of data fo C5, C6, R2, R3, R4, R5, R6 ninute of VE data for following 19 co C4, C5, C6, R3, R4, R5, R6	riod = 1 sec.) r the following even	t types: W, X, Y, Z, OR, E				



## Proposal 17318 - NUV Fold Test (51) - Cycle 31 COS NUV MAMA Fold Distribution

Diagn	ostic Status:	UV Fold Test (51) Warning						Wed May 29 18:00:16	GMT 2024	
0		Warning								
Scient		-	Diagnostic Status: Warning							
	tific Instrume	Scientific Instruments: S/C, COS/NUV								
Specia	al Requiremen	nts: BETWEEN 01-M	MAY-2024:00:00:00 AND 01-JUN-2	024:00:00:00; PARA	LLEL					
	•			· · · · · · · · · · · · · · · · · · ·						
норғ	R repeat for vi	isit 01.								
NUV	Fold Test (5	1)) Warning (Orbit P	lanner): MAXIMUM DURATION E	XCEEDED FOR IN	TERNAL OR EARTH C	CALIB SU				
		,,								
# ]	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
1 ]	Fold Test Se	DARK	S/C, DATA, NONE			SAA CONTOUR 32;	Same Alignment in	20.0 Secs (20 Secs)		
1	tup					SPEC COM INSTR	NUV Fold Test (51)	[==>]		
						ELFOLDSET		1	[1]	
Comn	ients: Special	setup for NUV Fold	Analysis Test. Set the Software Glob	al Monitor to 15.000	ORCOUNTS per sec (su	ufficient to allow for spi	ke at lamp turn-on).			
						<i>bb b b b</i>		2300.0 Secs. (2300 Secs)		
	rold rest	DECTERION			M;	ELFOLDTST;	NUV Fold Test (51)			
				1830 A	BUFFER-TIME=27	OESIPARM TARG		[==>]	[1]	
					00	TYPE FOLD			[1]	
Set Soc (1) Cz (2) Di (2) Di (2) Di (2) Di (3) Cc (4) (a) (b) (c) (d) (c) (d) (e) (f) (k) (l) (k) (l) (m) (c) (f) (c) (c) (c) (c) (c) (c) (c) (c	ftware Globa ftware Globa sable MAMA onduct fold an Enabled: C2 Enabled: C2 Enabled: C3 Enabled: C3 Enabled: C4, Enabled: C5 Enabled: C5 Enabled: C5 Enabled: C6 Enabled: C6 Enabled: C6 Enabled: C6, Enabled: C6, Enabled: C6, Enabled: C6, En	I monitor (SGM Thre ta during flat field il Folds: C2, C3, C4, C alysis. Collect one m , R2; Disabled: C3, C , R3; Disabled: C3, C , R4; Disabled: C2, C , R3; Disabled: C2, C , R3; Disabled: C2, C , R4; Disabled: C2, C , R5; Disabled: C2, C , R5; Disabled: C2, C , R6; Disabled: C2, C , R6; Disabled: C2, C , R5; Disabled: C2, C , R6; Disabled: C2, C , C4; Disabled: C2, C , R6; Disabled: C2, C , C4; D ,	eshold = 10,000, SGM Integration pe llumination. Collect 60 sec. of data fo C5, C6, R2, R3, R4, R5, R6 innute of VE data for following 19 cor C4, C5, C6, R2, R4, R5, R6 C4, C5, C6, R2, R4, R5, R6 C4, C5, C6, R2, R3, R5, R6 C3, C5, C6, R2, R3, R4, R5 C3, C5, C6, R2, R3, R4, R6 C3, C4, C6, R2, R3, R4, R6 C3, C4, C6, R2, R3, R4, R5 C3, C4, C5, R2, R3, R4, R5 C4, C5, R2, R3, R4, R5 C5, C6, R2, R3, R4, R5 C4, C5, R2, R3, R4 C4, C5, R2, R3, R4 C4, C5, R2, R3, R4 C4, C5 C4, C5 C4, C5 C5 C5 C5 C5 C5 C5	riod = 1 sec.) r the following event nbinations of MAMA EV and VE event type	types: W, X, Y, Z, OR, E folds: s.	EV, and VE.				
	HOPPI           NUV           #           Comm           FLAT           amp           Set So           (1) Cc           (2) Dic           (3) Cc           (a)           (b)           (c)           (d)           (e)           (f)           (g)           (h)           (i)           (i)           (ii)           (iii)           (i)           (iii)           (i)           (i)           (ii)           (iii)           (iiii)           (iiii)           (iiii)           (iiii)           (iiiii)           (iiiii)	HOPR repeat for v.         NUV Fold Test (5         NUV Fold Test (5         Fold Test (5         Fold Test Setup         Comments: Special         Prod Test         Comments: The NUFLAT and G185M/ amp off during the         Set Software Globa         1) Collect event da         2) Disable MAMA         3) Conduct fold ar         (a) Enabled: C2         (b) Enabled: C3         (f) Enabled: C4         (m) Enabled: C5         (f) Enabled: C4         (m) Enabled: C5         (f) Enabled: C4         (g) Enabled: C4         (g) Enabled: C4         (g) Enabled: C4         (g) Enabled: C5         (g) Enabled: C5         (f) Enabled: C4         (g) Enabled: C5         (g) Enabled: C6         (g) Enabled: C5         (g) Enabled: C6         (g) Enabled: C5         (g) Enabled: C6         (g) Enabled: C6	HOPR repeat for visit 01.         NUV Fold Test (51)) Warning (Orbit F         NUV Fold Test (51)) Warning (Orbit F         End Test Se DARK         tup         Comments: Special setup for NUV Fold         Pold Test Se DARK         tup         Comments: Special setup for NUV Fold         Pold Test DEUTERIUM         Comments: The NUV Fold Analysis will         FLAT and G185M/1850, and that the la         amp off during the exposure, and the exposure of local analysis. Collect one n         (a) Enabled: C2, R2; Disabled: C3, (b) Enabled: C2, R2; Disabled: C3, (c) Enabled: C2, R2; Disabled: C3, (c) Enabled: C2, R2; Disabled: C3, (c) Enabled: C2, R3; Disabled: C3, (c) Enabled: C2, R3; Disabled: C3, (c) Enabled: C3, R4; Disabled: C2, (d) Enabled: C4, R2; Disabled: C2, (e) (f) Enabled: C4, R2; Disabled: C2, (c) (f) Enabled: C4, R4; Disabled: C2, (c) (f) Enabled: C4, R5; Disabled: C2, (c) (f) Enabled: C4, R6; Disabled: C2, (c) (f) Enabled: C5, R5; Disabled: C2, (c) (f) Enabled: C4, R6; Disabled: C2, (c) (f) Enabled: C5, R5; Disabled: C2, (c) (f) Enabled: C4, R6; Disabled: C2, (c) (f) Enabled: C5, R5; Disabled: C2,	NUV Fold Test (51)) Warning (Orbit Planner): MAXIMUM DURATION E         NUV Fold Test (51)) Warning (Orbit Planner): MAXIMUM DURATION E         Image: the state of the s	<i>OPR repeat for visit 01.</i> NUV Fold Test (51)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR IN         #       Label       Target       Config,Mode,Aperture       Spectral Els.         Fold Test Se DARK       S/C, DATA, NONE         tup       Comments: Special setup for NUV Fold Analysis Test. Set the Software Global Monitor to 15,000         P       Fold Test DEUTERIUM COS/NUV, TIME-TAG, FCA G185M         Comments: The NUV Fold Analysis will be conducted during a deuterium lamp time-tag exposure         ZAT and G185M/1850, and that the lamp current is set to MEDIUM. Qesiparm TARGTYPE mug         amp off during the exposure, and the exposure commanding will issue a redundant lamp off conn         Set Software Global monitor (SGM Threshold = 10,000, SGM Integration period = 1 sec.)       1) Collect event data during flat field illumination. Collect 60 sec. of data for the following event       2) Disable MAM Folds. C2, C3, C4, C5, C6, R2, R3, R4, R5, R6         3) Conduct fold analysis. Collect one minute of VE data for following 19 combinations of MAMA       (a) Enabled: C2, R2; Disabled: C3, C4, C5, C6, R2, R3, R4, R5, R6       (b) Enabled: C4, R2; Disabled: C2, C4, C5, C6, R2, R3, R4, R5, R6       (c) Enabled: C4, R2; Disabled: C2, C4, C5, C6, R2, R3, R4, R5, R6       (c) Enabled: C4, R2; Disabled: C2, C4, C5, C6, R2, R3, R4, R5, R6       (f) Enabled: C4, R2; Disabled: C2, C4, C5, C6, R2, R3, R4, R5, R6       (f) Enabled: C4, R2; Disabled: C2, C3, C5, C6, R2, R3, R4,	Apple repeat for visit 01.         Apple repeat for visit 01.         NUV Fold Test (51)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH (         Image: Provide the image: Planner image	Apple repeat for visit 01.         NUV Fold Test (51)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU         Image: the state of the	Intervisit 01.         NUV Fold Test (51)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU         description: Start Config:Mode,Aperture       Spectral Els. Opt. Params. Special Reqs. Groups         Fold Test (51)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR EARTH CALIB SU         Maximum Config:Mode,Aperture       Spectral Els. Opt. Params. Special Reqs. Groups         Fold Test Se DARK       SC, DATA, NONE         Special setup for NUV Fold Analysis Test. Set the Software Global Monitor to 15,000 ORCOUNTS per see (sufficient to allow for spike at lamp turn-on).         Fold Test       DEUTERIUM       COSINUV, TIME-TAG, PCA       G185M       CURRENT-EMDU SPEC COM INSTR       Same Alignment in ELFOLDITS;         1850 A       M;       ELFOLDITS;       NUV Fold Analysis will be conducted during a deuterium lamp time-tac exposure specification will ensure that the FCA aperture will be LTAT and G185M/1850, and that the lamp current is set to MEDICM Quesipart TARGTPPE must be specified as TOLD so that the instructions will command the program of during the exposure, and the exposure commanding will issue a redundant lamp off command after the exposure specified as TOLD so that the instructions will command the program of during the field illuminitation: Collect to war, of duals for the following event types: W, X, Y, Z, OR, EV, and VE.         1) Collect event during tipe field illuminitation: Collect to war, for a duals for the following event types: W, X, Y, Z, OR, EV, and VE.	<i>Internet for visit 01.</i> NUV Fold Test (51)) Warning (Orbit Planner): MAXIMUM DURATION EXCEEDED FOR INTERNAL OR FARTH CALIB SU <i>I</i> <b>Label Config.Mode.Aperture Spectral Els. Opt. Params. Special Reg.s. Groups Exp. Time (Total)/(Actual Dur.)</b> Pold Test Se. DARK       SC, DATA, NONE       SAA CONTOUR 32; same Alignment in the properties of the software Global Monitor to 15.000 ORCOUNTS per sec (adficient to allow for opile at lange hum-on).       [==>1]         Comments: Special setup for NUV Fold Analysis Test. Set the Software Global Monitor to 15.000 ORCOUNTS per sec (adficient to allow for opile at lange hum-on).       [200.0 Seec (20 Sees)]         1       Fold Test       DEUTERRIM       COSNUV, TIME-TAG, FCA       G185M       CURRENT-MEDIU SPEC COM INSTR Same Alignment in the sec eposter control for opile at lange hum-on).         2       BUFFER.TIME=27       DESIDE NET       [==>1]       [==>1]         2       Control of the second that the lange current is at the MIRT MET must be properily at 100 mmand the proper lange. Note that the COM approxement is at the MIRT MET must be properily at 100 mmand the proper lange. Note that the command the p	

