



Cycle 22 COS/NUV Fold Distribution

Thomas Wheeler¹, Alan Welty¹

¹*Space Telescope Science Institute, Baltimore, MD*

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ABSTRACT

We summarize the Cycle 22 COS/NUV Fold Distribution for the Cosmic Origins Spectrograph's (COS)MAMA detector on the Hubble Space Telescope. The detector micro-channel plate's health state is determined and the results are presented.

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1. Introduction

The performance of the NUV MAMA microchannel plate is monitored using a MAMA fold distribution analysis procedure that provides a measurement of the distribution of charge cloud sizes incident upon the anode giving some measure of change in the pulse-height distribution of the MCP and, therefore, MCP gain. The goal is the continued monitoring of the NUV MAMA detector and comparing the results with previous results to detect trends or anomalous behavior. All visits of this program, Proposal 13976, were executed on 01 May, 2015. This program is based upon Cycle 21, Proposal 13531.

2. Analysis and Results

The engineering telemetry was examined (voltages, currents, temperatures, relay positions, and status) for agreement with predicted values and previous ground and on-orbit test data. MAMA time-tag image data was used to construct a histogram of the number of counts for each fold. The results are compared and combined with previous test results. See Figure 1. Posttest, a dark exposure was taken where the counters were cycled and are plotted in a histogram and compared with earlier results. See Figure 2.

The procedure for obtaining the COS MAMA detector fold data and the data analysis process is completely described in COS TIR 2010-01.

3. Summary

No anomalous behavior was detected. The COS NUV MAMA detector's micro-channel plate continues to perform as expected. The combined ground testing including SMGT and on-orbit fold analysis distribution for the NUV MAMA detector are shown. No significant changes or shift in fold number have occurred. The NUV MAMA does exhibit a known high dark count rate caused by widow phosphorescence that has been increasing since COS installation during SMOV4.

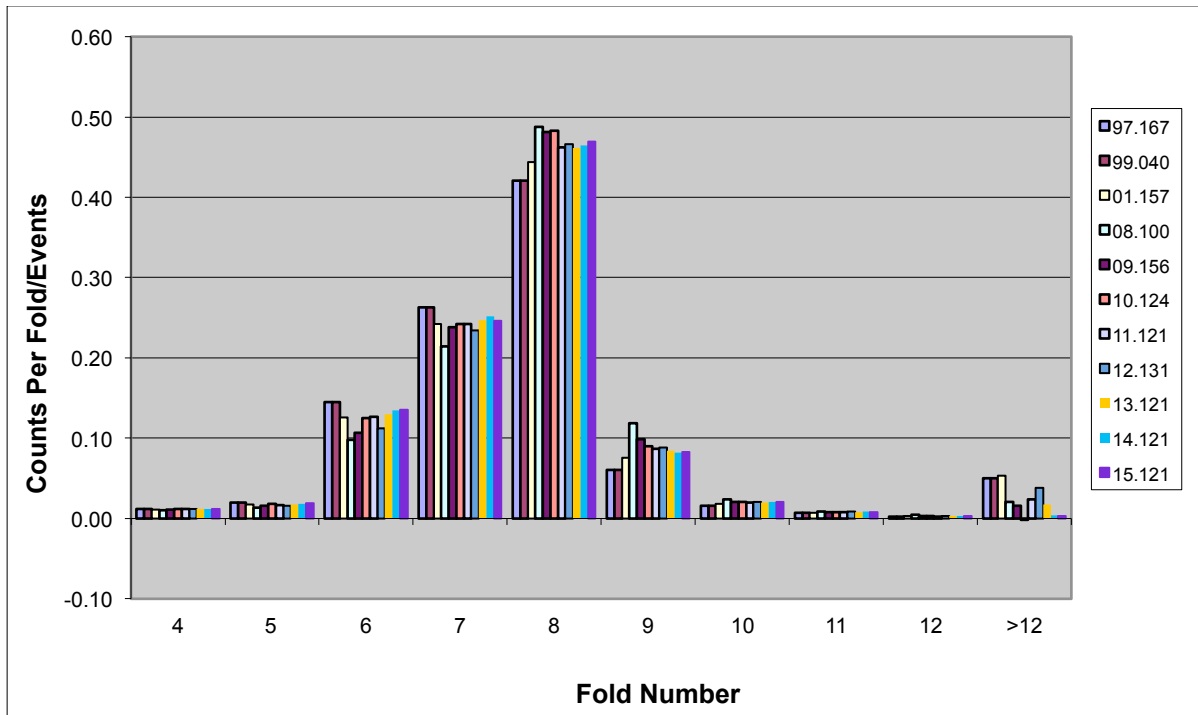


Figure 1: Normalized counts per fold event v. fold number.

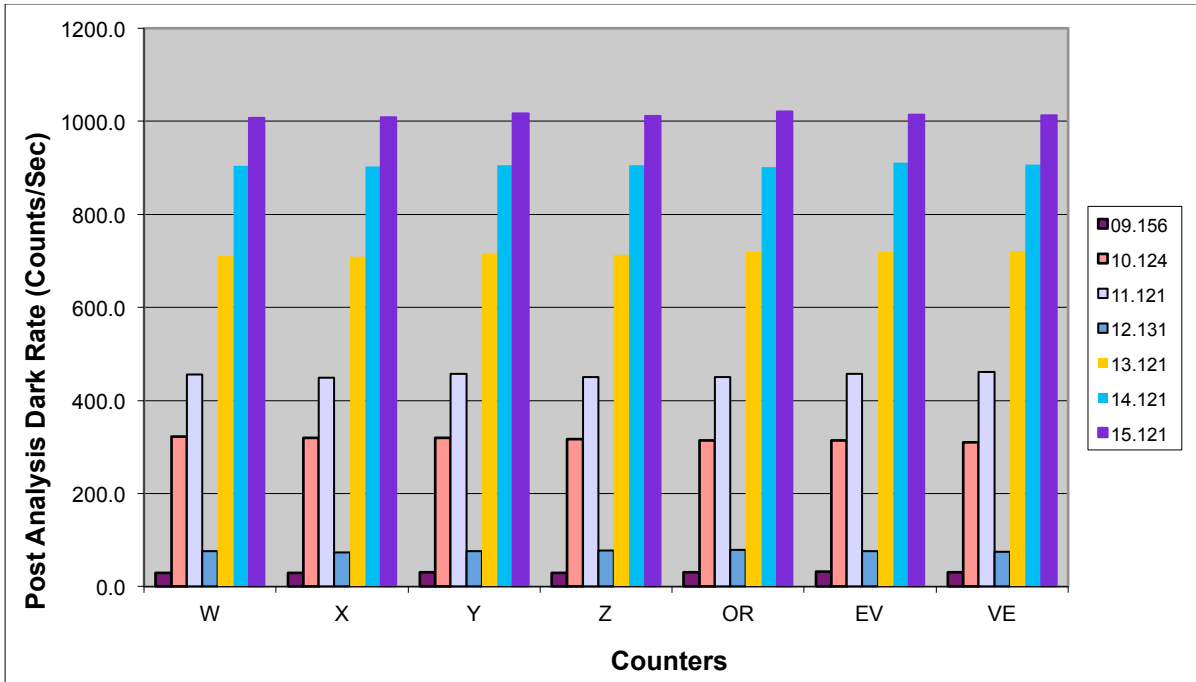


Figure 2: Post analysis dark rate v. count type

4. Change History for COS ISR 2016-14

Version 1: 20 September 2016 – Original Document

5. References

Thomas Wheeler and David Sahnou, 2010, Technical Instrument Report COS 2010-01, “COS SMOV4 NUV MAMA Fold Analysis”