



STScI | SPACE TELESCOPE
SCIENCE INSTITUTE

Instrument Science Report COS 2018-02 (v1)

Cycle 24 COS/NUV Fold Distribution

Thomas Wheeler¹ and Alan Welty¹

¹*Space Telescope Science Institute, Baltimore, MD*

13 February, 2018

ABSTRACT

We summarize the Cycle 24 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 presented.

Contents

- Introduction (page 1)
- Analysis and Results (page 2)
- Summary (page 3)
- Change History (page 3)
- References (page 3)

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 behaviors. All visits of this program, Proposal 14526, were executed on 01 May 2017. The program is based upon Cycle 23, Proposal 14444.

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 (Figure 1). Post test, a dark exposure was taken where the counters were cycled and are plotted in a histogram and compared with earlier results (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 distribution for the NUV MAMA detector are shown. No significant changes or shift in fold numbers have occurred. The NUV detector does exhibit a known high count rate caused by window phosphorescence that has decreased since the execution of this test in Cycle 23, one year earlier.

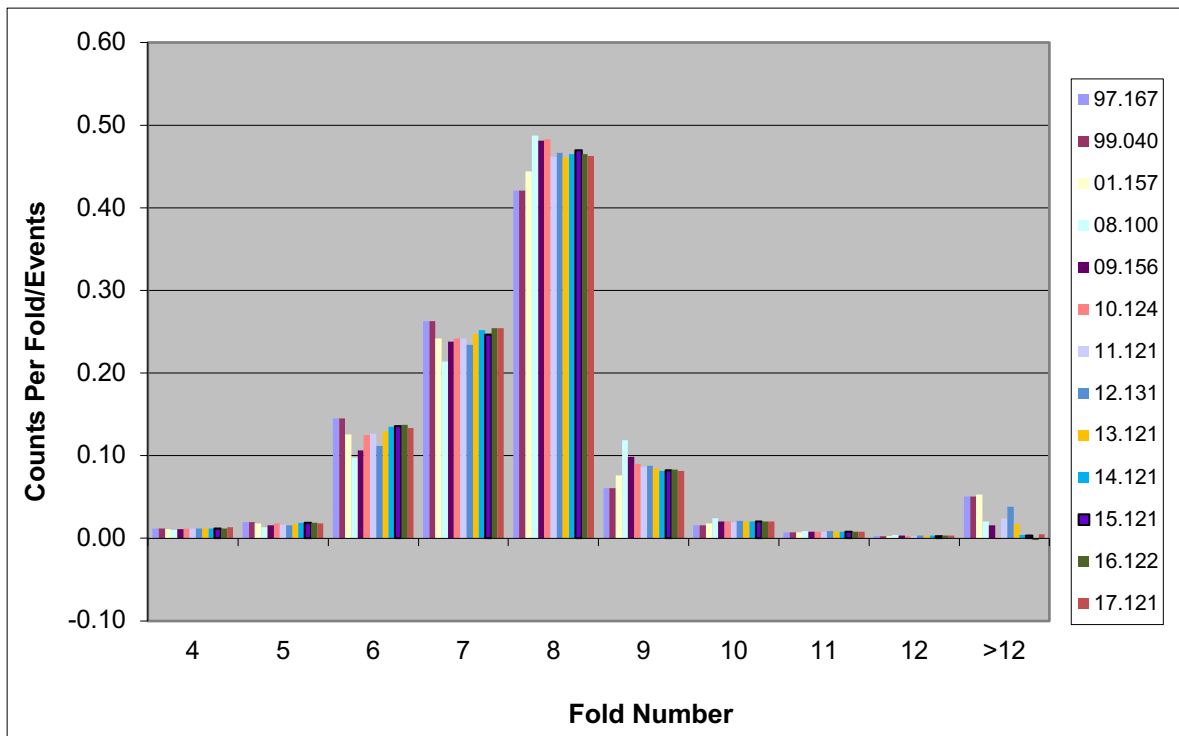


Figure 1: Normalized counts per fold event vs. fold number.

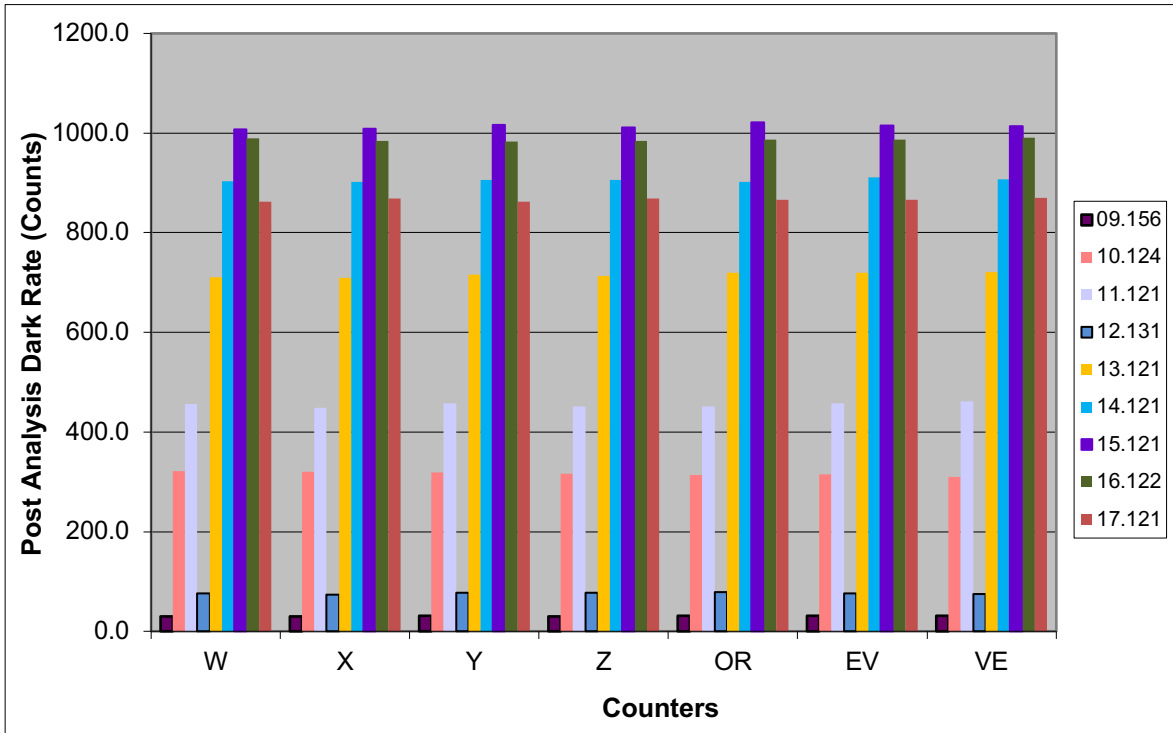


Figure 2: Post analysis dark rate vs. count type.

4. Change History for COS ISR 2018-02

Version 1: 13 February 2018 – Original Document

5. References

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