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STIS Vacuum Alignment - The Sequel

Pre-MAMA Activities

After low voltage is turned on, carry out the following activities. Their order does not matter.

1. Checkout IM Pt lamp and confirm that the fixes made at air yield proper operation of the lamp in vacuum (as deduced from current and voltage measurements; no imaging as yet).

We need pressure/time rules for the Pt lamp turnon, as it uses a moderately high voltage.

2. Make mechanism timing measurements as defined by Debi Rose.

3. Perform troubleshooting of MSM 6-step errors.

MAMA Activities

After the MAMA high voltage pressure/time rules have been satisfied (see Argabright/Woodgate treaty of March 22, 1996), ramp up MAMA (STF5) to normal MCP and "repeller on" voltages. Carry out those sections of the STIS-OAT-053 and "Modifications to, Rev. B" procedures that were missed during the first pumpdown period, as enumerated below. These consist primarily of data-taking using the IM subsystem Pt lamp.

1. *MAMA engineers - do you want a repeat of the Hg lamp exposure and valid event ratio data?*

WARNINGS

- After establishing that the Pt lamp comes on smoothly (no turn-on spike), we will be turning on with the CIM inserted (as in flight). *The lamp must be turned off for all slit wheel motions or MSM motions.*

- The other reasons to turn off the lamp between exposures are:

  -- to minimize its use

  -- to keep its temperature within limits.

- *Monitor and record the lamp temperature frequently.*

2. <u>8.7.1 Pt/Cr/Ne lamp first exposures and small slit settings (Mode 1.1)</u>

   -- Start at slit 63 as written.

   -- 8.7.1.7 Slit 25 will probably be a good choice (1" x 0.063") for getting a few thousand cts/sec.

   -- 8.7.1.8 The exposure does not need to be extremely deep. We will get a deeper Mode 1.1 exposure later.

3. <u>8.7.2 Pt/Cr/Ne lamp turn on time tagging (Mode 1.1)</u>

   -- With a slit giving a few thousand cts/sec, do a 5 minute time tag exposure. (Keep the rate x exposure time product below 4 million events, to fit in buffer memory.)

   -- Repeat time tag observation of turn on two more times.

4. <u>8.7.3 Pt/Cr/Ne lamp long slit selection (Mode 1.1)</u>

   -- Pick maximum safe rate two-pixel wide slit (either slit 34 “clear” or ND-filtered slit 61 “ND 1.2", most likely). *Confirm with SITS operator that the “OR count” event monitor has been set to trip at 100,000 per 0.2 seconds, not per second.*

   -- Take deep exposure to yield a good line list and Mode 1.1 intensity data set.

   -- If 1 mA setting is achieved by manual commanding from the 10 mA state, there is no point in taking a time tag exposure of the 1 mA turnon. Defer this measurement until the proper automatic software implementation of 1 mA turnon is in place (waiting until N2 testing is okay.)

   -- Use the TSAFPT PSTOL to ensure that the 10 --> 1 mA turnon occurs with the CIM out.

   --Take the first 1 mA exposure through a relatively small slit (such as slit 25) until it is confirmed that the lamp brightness is not fluctuating wildly.

   -- If the 1 mA brightness is stable, take a 1 mA exposure in the same slit as the 10 mA exposure to get a relative count rate.

   -- Take a deeper 1 mA exposure through a wider slit (0.2" or 0.5" as appropriate) to get a decent 1 mA spectrum.

   Science team: Based on these exposures, generate new estimates of the camera mode count rates with the various filters, based on the brightness observed at 1 mA in mode 1.1. The estimate need not be precise, as long as it is conservative and gives results

comfortably below the safe count rate limits for the MAMA.

5. <u>Long slit resolution maps for all first order and imaging modes</u>

-- Take long slit spectra or images in all first order and imaging modes.

-- *See attached sheets for latest MSM positions for all modes.*

-- Mode 1.6 and 1.6f -- take data with both “normal” and “perpendicular” two-pixel slits: will require ND filtered slits chosen from 59-61, 64-65.

-- Mode 1.7x3 may also require an ND-filtered slit.

-- Think about local rates in the bright lines (like 1524 Å), but it is almost certain that clear slits 34 and 51 will be appropriate for all 1.2 and 1.7x4 positions.

6. <u>Sample wavecal exposures for the echelle modes</u>

Take IM Pt lamp exposures at the primary MSM settings for the echelle modes as a test of how we plan to do the echelle wavecals. Take exposures in a short slit (no order confusion) and the longer slit 25 for comparison and confirmation that the longer slit still permits a good wavelength extraction.

-- Mode 1.3 p1 slit 19 (0.2" x 0.063")

-- Mode 1.3 p1 slit 25 (1" x 0.063")

-- Mode 1.4 p1 slit 20 (0.2" x 0.09")

-- Mode 1.4 p1 slit 25 (1" x 0.063")

-- Mode 1.4 p2 slit 20 (0.2" x 0.09")

-- Mode 1.4 p2 slit 25 (1" x 0.063")

-- Mode 1.4 p3 slit 20 (0.2" x 0.09")

-- Mode 1.4 p3 slit 25 (1" x 0.063")

7. <u>8.7.20 Camera mode flat field imaging at 1 mA</u>

Check the count rate for those camera mode-filter combinations for which predicted Pt lamp rates are safe at 1 mA.

The lamp must be turned on with the CIM out of the beam for 1 mA exposures!! Use the

“TSAFPT” PSTOL to automatically perform the CIM motions in the proper sequence with respect to lamp turnon.

--mode 1.6 aperture 11 (2" x 2") 1 mA !!!

Take a camera mode exposure through this smaller slit to confirm the predicted per pixel count rate before moving on to the larger apertures.

--mode 1.6 aperture 10 1 mA !!!

--mode 1.6f aperture 2 (Lyman Alpha) 1 mA !!!
--mode 1.6f aperture 3 (quartz) 1 mA !!!
--mode 1.6f aperture 7 (SrF2) 1 mA !!!

8.8 <u>Band 1 Image Quality Over Field of View</u>

Because the external illumination system can only cover a small field (< than the 6" x 6" arcsecond size of the slit called for by the procedure for this test), we will need to switch to using the IM Pt lamp.

We will use a combination of "edge acuity" tests, as the procedure calls for (which can only be done at very low per-pixel count rates) and narrow slit imaging tests using a 2-pixel cross-disperser slit at off-nominal slit wheel rotations. The narrow slit exposures can be at significant per pixel count rates and can thus be quite brief.

--image slit 65 at nominal slit wheel rotation, and at +/-0.65 degrees and +/-1.30 degrees from the nominal slit wheel rotation.

Note: these off-nominal slit wheel rotations will bring adjacent slits near but not into the MAMA field of view; the adjacent slits are slit 63 (0.20" x 0.05"; ND 1.0) and slit 57 (24.7" x 24.7"; ND 5).

Assuming Section 8.7 verified safe camera mode/large aperture operation with the IM lamp at 1 mA, carry out edge acuity tests using clear aperture 1 (24.7" x 24.7"), as originally planned.

Use the TSAFPT PSTOL to turn on the lamp and get it down to 1 mA with the CIM out of the beam!

--take an exposure with the aperture well-centered so that all 4 edges are visible on the detector.

--take exposures with the MSM tilted by +/-0.07 degrees in elevation from nominal centering, in order to put the top and bottom edges approximately 150 pixels from the edge of the detector.