www.rbdinstruments.com

25-120(A): Low Signal/Noise Problem

The 25-120 and 25-120A cylindrical mirror analyzers (CMA) have an electron multiplier which can be seen in Figure 1. These analyzers can be found on PHI 595, 600 and 660 Scanning Auger Systems.

Figure 1. Electron multiplier with cover

The multiplier has an aluminum cover (Figure 2) that can slide down and short out the collector housing. When this happens, the signal to noise ratio is reduced by a factor of three. Fortunately, this is an easy problem to diagnose and fix.

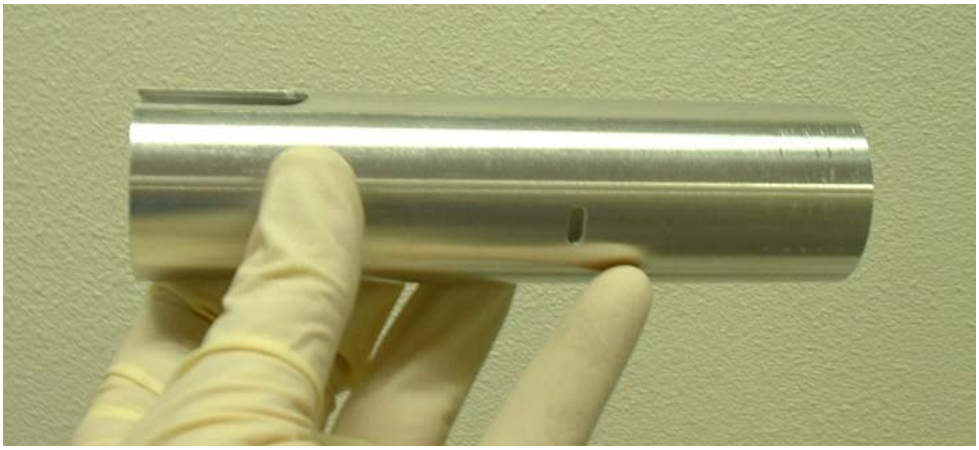

Figure 2. Multiplier cover

Testing your analyzer:

1. Turn off the following electronics:
    a. For a 595 turn off the 20-610, 20-620 and 32-100.
    b. For a 600 turn off the 20-610, 20-620A and 32-100.
    c. For a 660 turn off the 20-610, 20-622, and card rack power.

2. Next, remove the HV NEG cable on the 25-120(A) CMA and measure the resistance from the center pin on the multiplier NEG connector (not the cable) to the analyzer.
3. The measured resistance should be 3.0 MΩ. If it is less than 3.0 MΩ (say 1 or 2 MΩ) your CMA needs to be fixed using the repair procedure in the next section.

To repair this problem:

1. Vent the system and remove the electron multiplier from the CMA.
2. Slide the cover off of the multiplier.
3. Cut off ¼" of the cover from the end that is closest to the collector housing. In Figure 2, this is the right side of the picture.
4. "De-burr" the cover and clean it with a laboratory cleanser such as Alconox, followed by isopropanol, to remove any oils deposited during the cutting process.
5. Install a new gasket on the multiplier flange.
6. Slide the cover back over the multiplier assembly.
7. Re-install the electron multiplier into the CMA. See Figure 3.
8. Measure the NEG connector to the CMA to make sure that the resistance is now 3.0 Meg ohms.
9. Pump down the system.
10. Bake the system.

Figure 3. Reinstalling the multiplier into the CMA