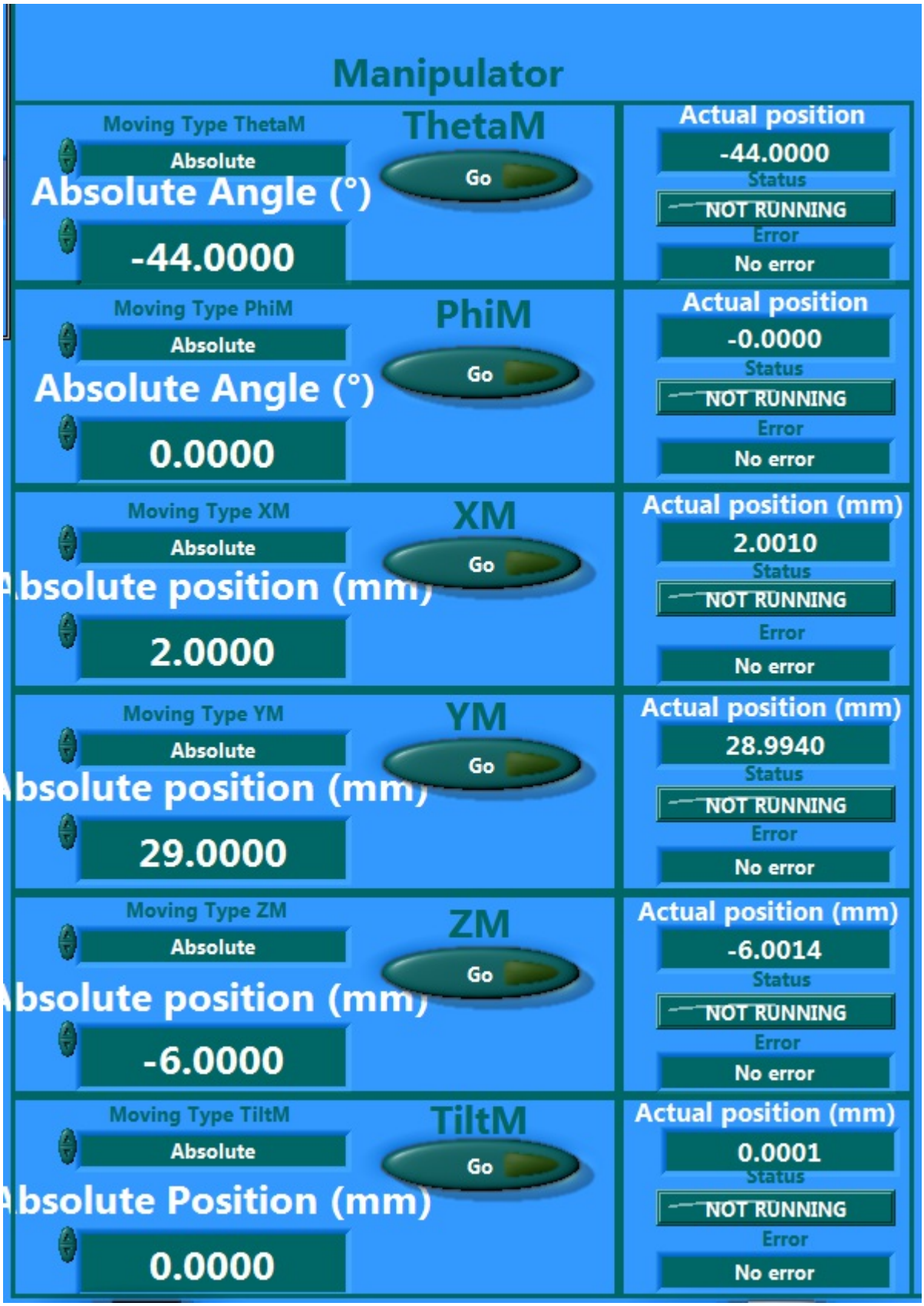
20220317
experiment Arneodo
E=2GeV
I=310 mA

Thursday 17th March 2022
10:30 sample holder 1 inserted into the chamber:
Graphite SS, Gold (good electrical connection) and ITO Radiator, ITO MLI (Poor or none electrical connection - via a carbon tape. Trying anyways)
beamspot positions:

Graphite SS: x=0,y=16mm,z=-6
Gold : x=-13mm,y=16mm,z=-6
ITO MLI: x=-13mm,y=21,z remains

ITO Radiator: x=2,y=29mm



macro: -30V bias on Keithly B (sample holder)
sample 1 test scan started at 11:10, beamspot only at Graphite
files 1 to 7 are garbage

KB = Keithley B (sample), KA = Keithley A (Mirror)
Region 1: 1 eV step 40-72 eV Al filter 20nA KB, 20nA KA
Region 2: 1eV step 70-102eV Si filter 20nA KB, 20nA KA
Region 3: 1eV step 98-260eV no filter 20nA KB, 200nA KA
Region 4: 1eV step 255-320eV Ag 0.6 200pA KB, 200pA KA

Region 5: 5eV step 312-1200 no filter 200pA KB, 20nA KA
Region 6: 5eV step 1180-1500 Ag 0.6 filter 200pA KB, 200pA KA

file 8 is a sensitivity test for graphite
file 9 is Graphite SS scan 40-1500 eV
file 10 is Gold scan 40-1500 eV. Scan saturated in Region 5 and was stopped. Only Regions up to 4 (including 4) are usable. macro name: macro_sampleholder1_graphite
file 11 is the rest of the scan (regions 5 and 6) with KB settings changed to 20nA in Region 5. Macro name: macro_sampleholder1_Gold_315_1500eV

A new macro is being set to scan from lower energies:
macro name: TEY_GNIM
energy step: 0.5 eV everywhere
regions:
Region 1: 3-4.5 B270
Region 2: 4-8 SiO2
Region 3: 7-12 LiF
Region 4: 11-18 In
Region 5: 15-25 Sn
Region 6: 23-45 no filter
Region 7: 23-45 Al

file 12 is scan of Gold 3-45eV, 0.5 eV step, using TEY_GNIM macro
file 13 is scan of Graphite 3-45eV, 0.5 eV step, using TEY_GNIM macro

sample holder 2 was loaded (Mg Alloy, ITO Radiator, ITO MLI)
beamspot positions:
ITO Radiator: x=-1mm,y=8mm,z=-6mm,ThetaM=-44deg
ITO MLI: x=-8mm,y=8mm,z=-6mm,ThetaM=-44deg
Mg alloy: x=-8mm,y=24mm,z=-6mm

good electrical connection with Mg alloy, not measurable connection with ITO Radiator now MLI

file 14 (is garbage) is scan of Mg alloy, 40-4500eV using macro_sampleholder1_graphite macro
scan stopped! to avoid saturation in region 5 again.

macro_sampleholder1_graphite was was overwritten with 20nA sensitivity in region 5

file 15 (is garbage) is scan of Mg alloy, 40-4500eV using macro_sampleholder1_graphite macro (corrected)
this scan seems corrupted though, Keithly B was not set up properly (error in Arduino bias, nonsense measured, needs to be repeated)

file 16 is a dark signal 200pA KA , not used for KB (do not use for KB!)
file 17 is dark 20nA mKA, 20nA KB

file 18 is dark is 200nA KA, 200pA KB

File 19 is scan of Mg alloy, 40-1500eV using macro_sampleholder1_graphite macro (corrected, essentially file 15 again butwith proper sample bias)
File 20 is scan of ITO MLI, 40-1500 ev, otherwise midentical to file 19 scan
File 21 is scan of ITO Radiator, 40-1500eV, otherwise identical. started remotely at 20:05
File 22 is scan of ITO Radiator, 3-45 eV, Using TEY_GNIM macro. Started remotely at 20:55
File 23 is scan of ITO MLI, 3-45 eV, using TEY_GNIM macro. Started remotely at 22:00
File 24 is scan of Mg Alloy, 3-45 eV. For this scan, a new macro was set up, called TEY_GNIM_fine. It is essentially identical to TEY_GNIM but the energy step is 0.1 eV instead of 0.5. This is because no previous scan of Mg in this energy region had been done before. Started remotely at 22:40. All valves should close after this scan. note: saturated in region 5 (15-25 eV), will be repeated in this region only.

Friday 18th March:
file 25 is garbage
File 26 is a scan of Mg alloy, region 5 (15-25 eV, GNIM grating, 0.1 eV step), KB range changed to 20nA there

a new sample holder (holder 3) was placed in the chamber:
Aerodag SS: x=0mm,y=20mm,z=-6mm
Coverglass: x=-12mm,y=20mm,z=-6mm

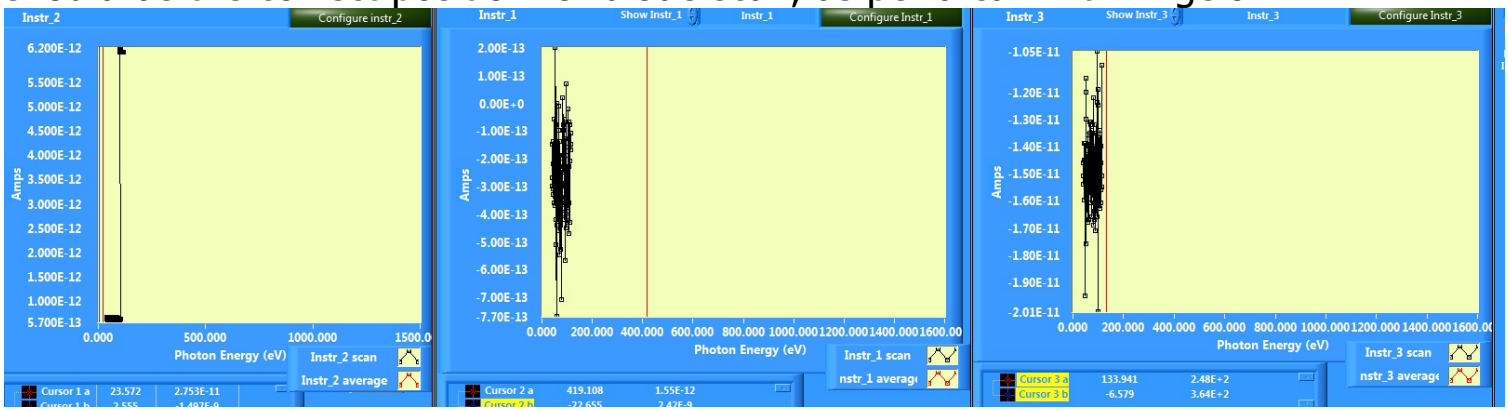
File 27 is a scan of Aerodag SS, 40-1500 eV, using macro_sampleholder1_graphite macro
File 28 is a scan of Coverglass, 40-1500 eV, using macro_sampleholder1_graphite

macro - saturated in region 3, stopped halfway
File 29 is coverglass again, region 3 KB range setto 200nA
File 30 is coverglass scan, 3-45 eV, using TEY_GNIM_fine macro (we do care about the low energies, as those were not recorded in August). This scan saturated in region 15-25 eV, otherwise good.
File 31 is a scan of the saturated region (15-25 eV) of the coverglass (file 30) only, setting KB to 20nA
File 32 mis scan of Aerodag (3-45 eV), using TEY_GNIM macro

File 33 is electroin analyzer position optimization scan (on Aerodag)
seems that carbon peak shows at z=-6.6mm
File 34 is garbage

File 36 is scan on Aerodag, 40-1500 eV, with Electron analyzer active.

PHOTODIODE SCANS:
File 37: photodiode all the way down, test scan if that is the correct position, only run for a few moments to get a rough estimate of the expected current from KC
File 38: photodiode all the way up, test scan if that is the correct position, only run for a few moments to get a rough estimate of the expected current from KC. This should be the correct position for diode scan, as per a call with Angelo



File 39 is garbage (forgot to turn the light off)
File 40 is scan on photodiode (40-1500 eV) - or at least we think it is. The metal sheath is fully compressed and the photodiode is at its highest point, corresponding to 0mm listed online. (as opposed to -192.5 listed when metal sheath is decompressed and photodiode at lowest position.

ok so it turns out that there was a beam dump, explaining why we didnt see anything in the past few scans, no beam spot in zero order, etc.

File 41 was started by Angelo after a new beam injection, stopped due to KC saturation. Range was put to 200uA
File 41 is again a photodiode scan, 40-1500eV. Saturated again, stopped
File 42 is garbage
File 43 is garbage, saturated

98-260 region KC range changed to 20 uA
File 44 - KC saturated again in 98-260 region, range changed to 200uA.

A new region was added (255-320eV), with full beam and KA 20uA.
File 45: scan on photodiode again, 40-1500eV. Saturated momentarily in KA around 300eV (with filter, not full beam) but was let to finish as the saturation span was small. Actually no, this scan saturated significantly above 600eV in both KA and KC, and the range of both was increased by one level (refer to the macro 40_1500 _photodiode)
File 46: scan of the photodiode again. It seems that a beam dump occured at 10:40pm, during this run.

Morning Saturday 19th:
shopper was opened, and the photodiode run was started again
File 47: photodiode scan, 40-1500 eV. KC looks good, KA saturated from 1200-1390 eV. This region needs to be repeated
File 48: photodiode scan 1190-1500 (last region) because it saturated in File 47

grating changed to GNIM
we just noticed that vertical exit slit has been up at 450 for all the photodiode runs, having the beam brightness very high. This likely explains the saturations on KC and KA that led us to increase the ranges a few times. The ranges will now be put back and the scan re-run
File 49 is garbage

a region 4.5 was added to the photodiode macro
photodiode scan macro:
KB = Keithley B (sample), KA = Keithley A (Mirror)
Region 1: 1 eV step 40-72 eV Al filter 20nA KB, 20nA KA, 2uA KC
Region 2: 1eV step 70-102eV Si filter 20nA KB, 20nA KA, 2uA KC
Region 3: 1eV step 98-260eV no filter 20nA KB, 200nA KA, 20uA KC
Region 4: 1eV step 255-320eV Ag 0.6 200pA KB, 200pA KA, 2uA KC
Region 4.5: 1eV step, 255-320eV, no filter, 200pA KB, 200pA KA, 2uA KC
Region 5: 5eV step 312-1200 no filter 200pA KB, 20nA KA, 2uA KC
Region 6: 5eV step 1180-1500 Ag 0.6 filter 200pA KB, 200pA KA, 2uA KC

File 50: ran up to region 4.5where KA promptly saturated. We changed to 20nA KA and reran. Looks good, finally

grating was set to GNIM
File 51 is good photodiode 40-1500eV data
File 52 is GNIM scan on photodiode, 0.5eV step, using TEY_GNIM_photodiode macro
File 53 is GNIM scan on photodiode, 0.1eV step, using TEY_GNIM_fine_photodiode macro

photodiode is now removed,grating moved to G1200

File 54 is an energy calibration run (interested only in KA and absorption features), using macro_calibration. A few datapoints between 290 and 293 eV saturated

File 55 is garbage because we didn't set instrument 3 to photodiode
File 56 is a short dark photodiode scan, KC=20pA (lights off, closed shutter)
File 57 is a short dark photodiode scan, KC=200pA (lights off, closed shutter)

Shopper was closed
File 58 is a short dark scan, KA=KB=KC=200pA
File 59 is a short dark scan, KA=KB=KC=20nA
File 60 is a short dark scan, KA=KB=KC=200nA
File 61 is a short dark scan ,KA=KB=KV=2uA
File 62 is a short dark scan, KA=KB=KC=20uA
File 63 is a short dark scan, KA=KB=KC=200uA

Monday 21st March:
a new sample holder was loaded into the chamber, inclusing NWA 11474 Lunar sample meteorite, NWA11273-767 meteorite, and Lunardust simulant (LHS-1) on a copper tape. The two rocks were clamped to the sample holder, the simulant was stuck onto a carbon tape.

NWA 11474 = thick meteorite, darker, smaller surface area
NWA11273-767 = thin meteorite, brighter, larger surface area and smooth on both sides

positions of the beamspots:
thin meteorite: x=-4.5,y=26mm,z=-9(tentative, analyzer scan needed first)
thick meteorite x=1.5mm(tentative),y=8mm,z=-12(tentative)

now a scan in z-direction will be done to find signal from each
thick meteorite: looking for Iron peak at 200nm
x changed to 0mm due to likely illumination of the clamp during z-scan
z=-10.2 looks reasonable

Final positions of beamspots on the rock samples:
thick (position 1): x=0mm,y=8mm,z=-10.2

thick (position 2): x=2.5,y=10,z=-15
thin (dark spot): x=-4.5,y=26,z=-14 (position 1,dark spot)
thin (bright spot): x=-4.5,y=23,z=-14 (position 2,bright spot)
lunar dust (pos 1): x=-12,y=10,z=-6

File 66 is analyzer scan on thick meteorite (position 1), G1200 grating, 40-1500 eV, using macro_40_1500_elanalyzer

File 67 is a z-position optimization scan

File 71 (was stopped) is a G1200 scan on thin meteorite, bright spot. Saturated around 120 eV, region 3 KB range changed to 200nA and was stopped
File 72 is a G1200 scan on thin meteorite, bright spot. Finished OK

a communication error with the monochromator occured

File 73 is a G1200 scan on thin meteorite, dark spot.

Calibration coefficients notes:
two regions were done improperly:
a)700-715eV missed the feature
b)1450-1500eV used Ag 0.6 filter while it should have been Al (Aluminum)
start from 1400eV instead in the correction run!

File 74 (was stopped as it would take about 2 hours) is a correction energy calibration scan, monly in 2 regions:
a)1690-725eV
b)1400-1600eV, using Al filter

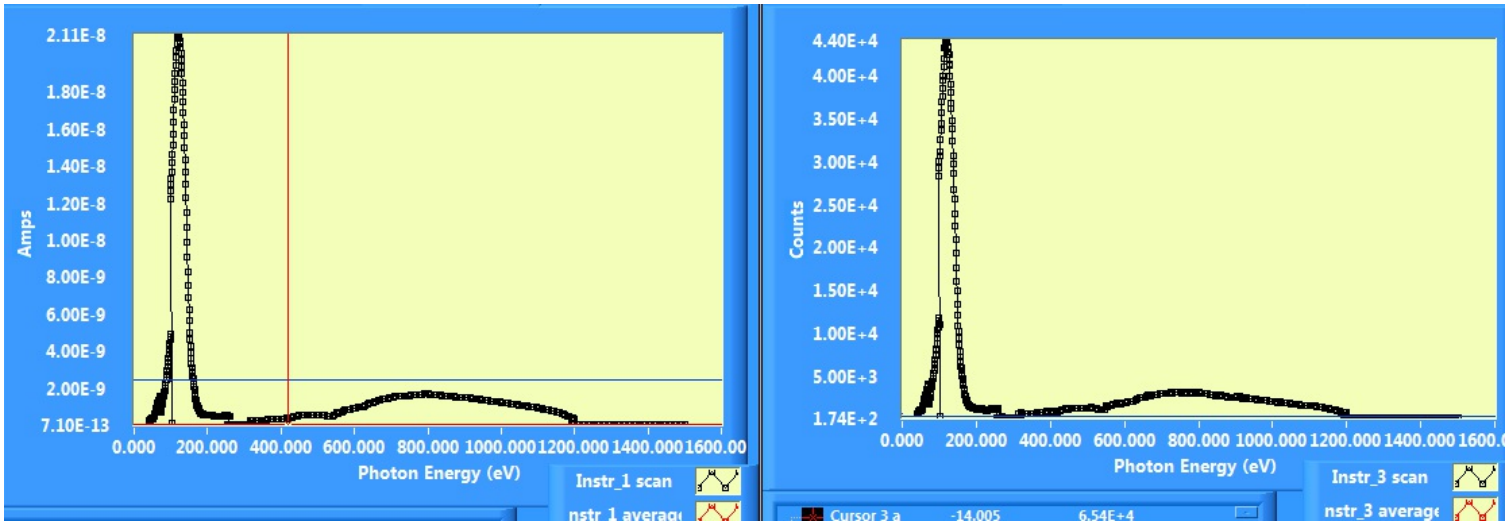
Calibration coefficients:
48.5eV-50.5eV to 71-74eV: coeff1=0.993416, coeff0=0.334699
71-74eV to 97-102eV: coeff1=0.997869, coeff0=0.264657
97-102eV to 272-295eV: coeff1=0.646822, coeff0=1.56458
272-295eV to 380-405eV: coeff1=0.0978598, coeff0=2.69488
380-405eV to 500-530eV: coeff1=0.0574908, coeff0=2.14519
500-530eV to 690-725eV: coeff1=-0.333024, coeff0=3.1823
690-725eV to 1400-1600eV coeff1=1.77932, coeff0=-0.678785

File 77 is garbage
File 78 is a G1200 analyzer scan on THICK meteorite, position 2
File 79 is a G1200 analyzer scan on the lunar simulant

File 80 is a correction energy calibration scan, only in 2 regions:
a)690-725eV
b)1400-1600eV, using Al filter

File 81 is a lunar dust simulant scan, 3-45 eV, using TEY_GNIM_fine_elanalyzer macro
File 82 is a 3-45 eV scan on thin meteorite (position 2, bright spot),

TEY_GNIM_fine_elanalyzer macro
File 83 isa 3-45eV scan on thin meteorite (position 1,dark spot),
TEY_GNIM_fine_elanalyzer macro
File 84 is a 3-45eV scan on thick meteorite (position 2): x=2.5,y=10,z=-15
File 85 is a 3-45 eV scan on thick meteorite (position 1): x=0mm,y=8mm,z=-10.2



end of experiment