



Jefferson Lab Alignment Group

Data Transmittal

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FROM: Kelly Tremblay

Checked:
: A1898

DETAILS:

data: inspection\halla\moller_detector\181221a; step2a\halla\181218a & b
 Paddles : step2a\halla\190108a
 Mol Target : step2b\halla\moller target\190118a

The Hall A Moeller experimental components were surveyed between December 18th and December 21st, 2018. Additional surveys in January, 2019 for the Moeller paddles and target have also been added. The ideal (designed) coordinates and angles are shown in the first table in meters and degrees relative to the JLab's CEBAF coordinate system.

The as-found table shows the current location in CEBAF system (meters) and the beam following system (BFS) in millimeters. The BFS data shows the as-found position as it follows the beam relative to the ideal position. In the BFS, a positive dx value is to the beam left looking downstream along beam from the ideal; a positive dy is along beam vertically from ideal (note the pitched data bfs xyz coordinates are along the pitched beamline – dy not truly vertical); A positive dz is downstream from ideal. The delta angle are shown in degrees and are the differences (found – ideal) from ideal. The distance from the standard Hall A target is shown [not APEX target].

MOLSOL refers to the Moeller Solenoid; MOLTAR is the Moeller target; MMA1H01 is the dipole magnet; MOLBOX is the detector box; MOLDET are the detectors in the detector box; Hall A target is shown for reference.

CEBAF IDEAL DATA						
	Accelerator coords METERS			ideal angles degrees		
	x[m]	y[m]	z[m]	yaw	pitch	roll
MOLSOL	-43.57183	100.02200	-379.19945	142.5000	0.0000	0.0000
MOLTAR	-43.57183	100.02200	-379.19945	142.5000	0.0000	0.0000
MMA1H01	-41.03793	100.02200	-382.50167	142.5000	0.0000	0.0000
MOLBOX	-39.25683	100.02200	-384.82285	142.5000	0.0000	0.0000
MOLDET	-39.02864	99.50960	-385.12024	142.5000	-7.3000	0.0000
Hall A Target	-32.95843	100.02200	-393.03108	142.5000	0.0000	0.0000

FOUND DATA										
	found accelerator coords METERS				BFS [mm]			delta angles degrees		
	x[m]	y[m]	z[m]	to target[m]	dx	dy	dz	dYaw	dPitch	dRoll
MOLSOL	-43.57177	100.02197	-379.19945	17.43436	-0.05	-0.03	0.04	0.00872	0.00229	-0.00458
MOLTAR	-43.57340	100.02158	-379.19864	17.43600	0.75	-0.42	-1.60	0.01020	-0.25497	-0.18134
MMA1H01	-41.03782	100.02216	-382.50142	13.27216	-0.24	0.16	-0.13	0.01565	0.01862	-0.01604
MOLBOX	-39.25721	100.05734	-384.82372	10.34579	0.83	35.34	0.46	0.07513	0.00458	-0.0636
MOLDET	-39.02402	99.55356	-385.13015	9.96073	2.37	43.96	10.68	0.60851	0.25205	0.61078

The downstream location of the Moller detector PMT tubes in the 'oven' box are shown below. The coordinates show the original fiducialized values of the center end of each PMT cylinder, plus the September 2012 and December 2018 as-found location relative to the respective MOLDET locations. The detector box has been adjusted and moved between the 2012 dates and the current 2018 survey. (ref data transmittals A1496 and A1652).

The coordinates are in millimeters. Movements are beam following as explained above. The ideal fiducial values are shown for reference. L1 – L4 are beam left with 1 at top, 4 at bottom. R1-R4 beam right top to bottom. Cen is the center based on the fiducialized values.

Internal PMT Ends - Millimeters in Beam Following System											
2012 fiducialized PMT tube ends				Asfound 2012 PMT locations				Asfound 2018 PMT locations			
PMT	x[mm]	y[mm]	z[mm]	PMT	x[mm]	y[mm]	z[mm]	PMT	x[mm]	y[mm]	z[mm]
L1	53.5	112.9	0.1	L1	54.2	124.0	8.5	L1	55.2	158.0	4.3
L2	53.5	37.9	0.9	L2	55.0	49.0	9.6	L2	55.9	83.0	5.4
L3	57.5	-41.4	-0.7	L3	59.7	-30.4	8.1	L3	60.6	3.7	3.9
L4	54.8	-114.8	2.4	L4	57.9	-103.8	11.5	L4	58.7	-69.7	7.2
R1	-51.4	113.7	-1.6	R1	-50.7	123.7	7.7	R1	-49.8	157.8	3.5
R2	-52.9	40.6	-0.3	R2	-51.5	50.5	9.3	R2	-50.5	84.7	5.0
R3	-58.8	-36.9	-1.8	R3	-56.6	-27.0	8.0	R3	-55.7	7.1	3.7
R4	-56.2	-111.9	1.1	R4	-53.2	-102.0	11.2	R4	-52.3	-67.8	6.9
Cen	0.0	0.0	0.0	Cen	1.8	10.5	9.3	Cen	2.7	44.6	5.0

The magnet center as-found data from 2012 to 2018 is shown below:

	ideal accel coords METERS			ideal angles degrees		
MOLPMT	x[m]	y[m]	z[m]	yaw	pitch	roll
Ideal	-39.02864	99.50960	-385.12024	142.50000	-7.30000	0.00000

	found accel coord METERS			BFS [mm]			delta angles degrees		
MOLPMT	x[m]	y[m]	z[m]	dx[mm]	dy[mm]	Dz[mm]	dYaw	dPitch	dRoll
2012	-39.02369	99.51873	-385.12963	1.79	9.13	10.46	0.50924	0.15100	0.61308
2018	-39.02434	99.5532	-385.1304	2.743	43.603	10.638	0.43679	0.19200	0.59932

Paddles

The upstream paddles RA4 and LA4 were located on January 8th, 2019. The first table below shows each of the corners for the entrance box at the upstream face of the 'oven'. These points were calculated using the intersection of the adjacent two planes and the upstream face. The second table is the location of the corners for RA4 and LA4. Refer to the sketch for their locations.

There are two sets of coordinates. Coordinates relative to the MOLTAR are based on the ideal location of MOLDET from above and along the pitched beamline. The second set of coordinates are based on the standard target location with positive Z upstream along beam.

Coordinates of corners - entrance box							
Coords relative to MOLTAR				Coords relative to Target			
Corner	x[mm]	y[mm]	z[mm]	Corner	x[mm]	y[mm]	z[mm]
bot_bl	62.6	-118.7	-904.6	bot_bl	-62.6	-515.7	10883.8
bot_br	-63.7	-119.0	-904.3	bot_br	63.7	-516.0	10883.5
top_bl	62.4	170.9	-941.3	top_bl	-62.4	-223.7	10883.4
top_br	-63.5	170.9	-941.1	top_br	63.5	-223.8	10883.1

Coordinates of paddle points and corners							
Coords relative to MOLTAR				Coords relative to Target			
Point	x[mm]	y[mm]	z[mm]	Point	x[mm]	y[mm]	z[mm]
RA4_crn	-49.6	-111.6	-663.8	RA4_crn	49.6	-539.2	10644.0
RA4_br	-48.7	-111.8	-660.7	RA4_br	48.7	-539.8	10641.0
RA4_us	-61.0	-111.8	-663.2	RA4_us	61.0	-539.4	10643.4
RA4_t	-51.2	-7.9	-667.2	RA4_t	51.2	-435.9	10634.2
LA4_crn	40.3	-111.5	-662.2	LA4_crn	-40.3	-539.3	10642.4
LA4_bl	40.6	-111.7	-658.5	LA4_bl	-40.6	-540.0	10638.7
LA4_us	53.1	-111.8	-662.2	LA4_us	-53.1	-539.6	10642.4
LA4_t	40.8	-6.7	-666.0	LA4_t	-40.8	-434.8	10632.9

