Jefferson Lab Alignment Group

Data Transmittal

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DETAILS: data: step2a -> \svt\171117a -> \htcc\171117a ->12g_target\171121b

The table below shows the Hall B equipment that was aligned between November 16th and November 21st. Working with Hall B staff, the components were set as close as deemed possible, without colliding with installed Hall equipment. It was found that HTCC needed to be placed 9.5 millimeters upstream from the Torus magnet and the Solenoid needed to be set 10.0 millimeters upstream of the HTCC. The SVT / Micromegas cart and target cart were inserted into the Solenoid to the correct relative position to the Solenoid, but as a result of the previous mentioned Z offsets, the components were set 19.5 mm upstream of the ideal 12GeV target. All Z deltas are relative to the ideal 12GeV target.

The target assembly is on a rail system with the target cell approximately 6.5 meters cantilevered downstream from the adjustment mechanism. It was discovered that even with the rails aligned to the best possible values (all transverse to beam values less than 1.0 millimeter) alignment problems arose. As the cart was inserted, the target scattering chamber came close to being in contact with the SVT detectors on the beam right side but then swung back to be out of alignment on the beam left side. The cause of this is a lever arm from the adjusters to the target of approximately 4:1. This is exasperated due to the slight mis-alignment of the rails.

The data below shows the ideal values for each component, the ideal x,y,z in the CEBAF coordinate system, the offsets from that ideal in the beam following system (BFS) and the angular difference from ideal beam following values. In the BFS, a +x indicates the component is to the beam left; a +y is above ideal; a –z is upstream from ideal. A +yaw is counter clockwise about the y axis; +pitch is counter clockwise about the x axis; +roll is clockwise about the z axis.

Component	Ideal [meters]			BFS [mm]			Angular [degrees]		
	x[m]	y[m]	z[m]	x[mm]	y[mm]	z[mm]	yaw[deg]	pitch[deg]	roll[deg]
HTCC	-80.60000	103.35526	-398.82153	0.06	-0.02	-9.46	0.00029	0.00201	0.00602
Solenoid	-80.60000	103.35526	-398.82153	-0.66	-0.12	-19.48	-0.00344	0.01461	0.0043
SVT	-80.60000	103.35526	-398.82153	0.68	0.38	-19.35	0.01346	0.02091	0.03696
Target	-80.60000	103.35526	-398.82153	3.45	-0.42	-19.42	0.01862	0.00057	-0.01031