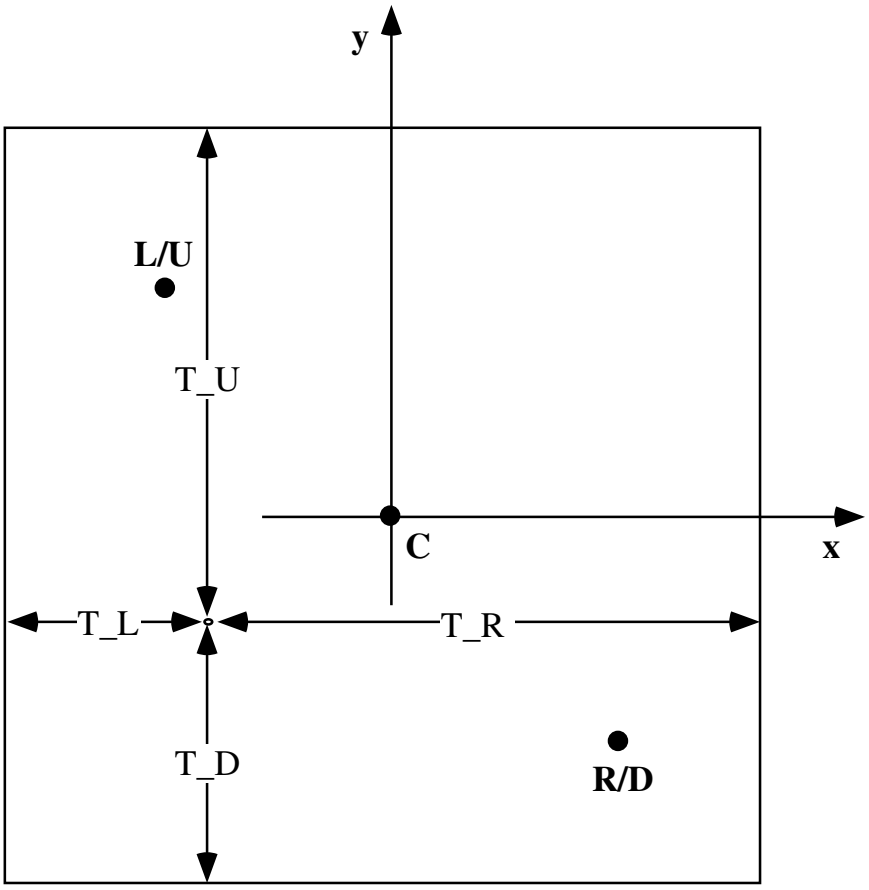
BEAM CHAMBERS

The 4 Beam Chambers (BC) are wire chambers with a double wire layer, one in the x and another in the y direction (the beam direction be the z axis). The signal is read through a delay line. It means that each particle gives 4 signals in one BC, 2 for each layer (see fig.). So the coordinate is given by:

x-coord = T_R - T_L
y-coord = T_U - T_D

Three calibration points are available for injecting a test pulse. The 3 calibration points are named Left/Up, Center and Right/Down, according to their position in the BC. Each point is distant 30 mm in x and 30 mm in y from the neighboring one. Therefore, with respect the reference system in fig., centered in the point C, the three calibration points are (in mm):

L/U = (-30,+30)
C = (0,0)
R/D= (+30, -30)



Looking at the oscilloscope, we estimated the delay line velocity as about 2.67 ns/mm (or 0.375 mm/ns). This explains why the BC resolution can hardly be better than 0.4 mm.

To calibrate the BC you need to measure the time delay ΔT when a test pulse in injected in a known position of the chamber. ΔT can be measured at the oscilloscope. Here below you find the numbers. You also need the relationship between TCD counts and time, which is :

1 TDC unit = 0.8 ns

The TDC was a CAEN V767 (http://www.caen.it/nucleare/catalog_products.htm)

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From: Gyorgy Bencze
Subject: beam chamber calibr

Left column: The location where the test pulse was sent.

Upper row: The delay (in ns) between the two output signals (left and right, up and down respectively). Positive, if the right (or down) coming later.

Left: Jura (or control room) side. Right: Saleve side.

Error bar: 1-2 nsec.

Example: 1-st chamber.
When the test pulse was sent to the left-up point (30 mm to the left and up from the center), the right output pulse at the TDC input is coming later then the left one by 162.5 ns.

1-st chamber:

----------	Right-Left	Down-Up
Middle	5.5	5.5
Left/Up	162.5	162.5
Right/Down	-160.0	-161.5

2-nd chamber:

----------	Right-Left	Down-Up
Middle	4.0	0.0
Left/Up	169.25	162.25
Right/Down	-165.0	-165.5

3-rd chamber:

----------	Right-Left	Down-Up
Middle	4.0	-1.0
Left/Up	168.25	165.75
Right/Down	-163.25	-163.5

4-th chamber:

----------	Right-Left	Down-Up
Middle	-6.0	3.25
Left/Up	159.0	169.0
Right/Down	-173.5	-166.25

CORRESPONDENCE AMONG TDC CHANNELS AND BEAM CHAMBER CHANNELS.

BEAM CHAMBER #1	**BC#2**	**BC#2**	**BC#3**
CH 66 =T_L	ch 72	ch 80	ch 88
CH 67 =T_R	ch 73	ch 81	ch 89
CH 68 =T_D	ch 74	ch 82	ch 90
CH 69 = T_U	ch 75	ch 83	ch 91
CH 70 = Anode (unusefull)	ch 76	ch 84	ch 92

CH 121 = total number of hits in the Beam Chamber TDC.

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