Using the alignment method of full metric and comparing using half metric to see if spatial effect plays a role.

For TDC2 and 1, you can either use a full metric or a half metric format

[3,0,3,0,2,0], [3,2,3,2,2,1] and default for full

For half metric [-1,-1,2,1,2,1][-1,-1,2,0,2,0] and default

We need to compare the quality of alignment

Using the two method gave identical alignment

The only weir behavior at tdc2 and tdc1 at 25k event is purely due to the order of alignment, which is currently set to 10, 21, 20. This was likely due to 10 failed to align in one setp, and 21 introduced further alignment, and 20 then realigned 0 again, that is why all three graphs showed alignment.

The metric really works well, noise plays very little role. Atm just do the most basic pairwise alignment is good (very slow but works), apparently sequence alignment has NOTHING TO DO with this……

The reason for tdc0 and tdc1 having the averaged less was because they used 3 RPCs(RPC1, 2 eta and RPC0,1, phi) instead of 2, which avoided double counting. Imagine if you having a event in rpc0 and 1, which will be picked up if by both the eta and phi strip, counting it twice in the metric when calculating the diff, only Tdc1 and 0 are independent from this, so they are aligned

Introduced the alignment matrix, so the data is presentable…. Probably not the most efficient way of doing stuff…..

Updated realignment matrix

Prove aligning sequences A, B and C pairwise will align the sequence globally

There are so many proofs out there bro…

A graph of a graph of a number of different colored lines

Description automatically generated with medium confidenceA graph of a graph

Description automatically generated with medium confidence

A graph of a red and blue line

Description automatically generated

A graph of a sound wave

Description automatically generated

A graph of a graph of a number of different colored lines

Description automatically generated with medium confidence

A graph of a graph

Description automatically generated with medium confidence

A graph of two people

Description automatically generated

A graph of two people

Description automatically generated

Top: Half metric alignment, Bottom: Full metric cross chamber alignment. I am sold

A graph with numbers and lines

Description automatically generated

Alignment good for the bottom three TDCs. All mapping can be found in github

def find\_tdc\_alignment\_metric(tdc0, tdc1):

    if tdc0 > tdc1:

        tdc0, tdc1 = tdc1, tdc0

    i, j, k, l = None, None, None, None

    if tdc0 == 0:

        if tdc1 == 1:

            i, j, k, l = 1, 2, 0, 1

        if tdc1 == 2:

            i, j, k, l = 3, 0, 3, 0

        if tdc1 == 3:

            i, j, k, l = 4, 0, 4, 0

        if tdc1 == 4:

            i, j, k, l = -1, -1, 5, 0

    if tdc0 == 1:

        if tdc1 == 2:

            i, j, k, l = 3, 2, 3, 2

        if tdc1 == 3:

            i, j, k, l = 5, 2, 4, 1

        if tdc1 == 4:

            i, j, k, l = -1, -1, 5, 1

    if tdc0 == 2:

        if tdc1 == 3:

            i, j, k, l = 4, 3, 4, 3

        if tdc1 == 4:

            i, j, k, l = -1, -1, 5, 3

    if tdc0 == 3:

        if tdc1 == 4:

            i, j, k, l = -1, -1, 5, 4

    return i, j, k, l

i , j, k, l are rpc number for etahits1 etahits2 phihits1 phihits2, -1 means using half metric

TDC3 is very very very bad, this is because the efficiency of the top 2 RPCs are very poor, they don’t get much hit from

Offsets of 10-30 are seen in TDC2 and TDC3 alignments, which were very meaningless.

A graph of a graph with red and blue lines

Description automatically generated

A graph with blue bars

Description automatically generated

A graph of a number of numbers

Description automatically generated

Found a new alignment, offsetting by -2 idx is 200 updated TDC 3

Found a new alignment, offsetting by 1 idx is 9000 updated TDC 2

Found a new alignment, offsetting by 1 idx is 32200 updated TDC 2

Found a new alignment, offsetting by 16 idx is 59400 updated TDC 2

Found a new alignment, offsetting by -18 idx is 67600 updated TDC 3

Found a new alignment, offsetting by 4 idx is 91600 updated TDC 2

A graph showing a graph of a function

Description automatically generated with medium confidence

There were something funny going on…