

Status report

2025/03/20 ZDC Internal WAI YUEN CHAN



- Get down to the workshop, install the beam test setup
- Make a plotter to plot the histogram for ML sample
 - Tried to use ROOT, but didn't work well.
 - Eventually use matplotlib to build a prototype.
- Today/Tomorrow: Job submission pipeline test



ML Sample: Histogram







- We make use of the ROOT file structure (looping over entries), we can make a 20x20 2D array to store the energy per cell.
- A print out with energy per cell (amplified by 10000 times for visual purpose) in 1 example event has been shown as a 2D array:

]]	Ø	0	0	0	0	0	0	0	0	0	10	3	12	0	0	0	0	0	0	0]
[0	0	0	0	0	0	0	0	0	0	7	37	4	0	0	0	0	0	0	0]
[0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0]
]	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0]
]	0	0	0	0	0	0	0	0	0	0	5	0	0	14	2	0	0	0	0	0]
]	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0]
]	0	0	0	0	0	0	0	0	0	0	8	25	0	0	5	0	0	6	0	6]
]	0	0	0	0	0	0	0	0	0	0	12	13	33	14	4	3	18	0	0	0]
]	0	0	0	0	0	0	0	0	5	1	47	163	141	39	36	12	3	0	0	0]
]	0	0	0	0	0	0	0	2	0	13	196	33	210	81	8	7	3	0	0	0]
[0	0	0	0	0	0	0	2	0	13	60	196	217	47	22	0	0	0	0	0]
]	0	0	0	0	0	0	0	0	5	2	12	34	29	6	9	7	0	0	0	0]
]	0	0	0	0	0	0	0	0	0	4	0	89	28	51	6	0	0	0	0	0]
[0	0	0	0	0	0	0	0	0	0	1	11	0	5	50	0	0	0	0	0]
[0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0]
]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0]
[0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0]
[0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0]
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]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0]]

Reminder (II)



y(mm)





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2D Histogram

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2D Histogram (Entry 10630) • We can transfer the array into 2D 0 0.001 0.001 Histogram for each single event. 1 2 3 4 0.001 5 6 0.003 7 0.001 0.001 0.003 0.00 0.002 0] 8 .005 0.016 0.014 0.004 0.004 0.001 0] 0] axis 9 0.001 0.020 0.098 0.008 0] × 10 0.001 0.006 <mark>0.096</mark> 0.047 0.005 0.002 0] 6] 11 0.001 0.003 0.003 0] 12 0.009 0.003 0.005 0] 01 13 196 0.001 0.005 0] 14 0] 0] 15 0] 16 0] 0] 17 0] 18 0] 0] 19 0]] 9 10 11 12 13 14 15 16 17 18 19 0 2 8 1 6 7

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X axis

- 4

- 3

- 2

- 1

Values



 For each event we have also record the sum of energy and the number of cell which have energy >= 0.001 GeV

Entry	1063	30	2D ar	ray:																
[[0.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.]
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[0.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.]
[0.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.]
[0.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.]
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[0.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.]
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[0.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.	Θ.]]
Total	sum	of	all	elem	ents	: 3.	4													
Number	r of	el	ement	s >=	0.0	01:	35													

1D, 3D Histogram



4 3 2 1 0 0.0 0.0 2.5 2.5 5.0 5.0 7.5 7.5 10.0 12.5 10.0 12.5 ₁ 3^{1,5} ratis 15.0 15.0 17.5 17.5 20.0 20.0

3D Histogram (Entry 10630)

• 1D and 3D histogram will help us to identify any decay product hit the ECAL



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• 2D histogram for multiple events are also available.



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Outlook



- We made a prototype plotter which can read the array and plot 1D,2D and 3D histograms. However, we should also plot the histogram from different energy range (e.g. 0-5 GeV, 5.1-10 GeV ...) in order to have more useful information
- Minor: change the naming in the code
- Job submission pipeline test (try 1k sample should be fine)