Optimization of the RoI size using the offline E/M clusters.

- Selection of the E/M cluster.
- Defining the regions.
- Statistics.
- Results.
- Conclusions - Next steps.

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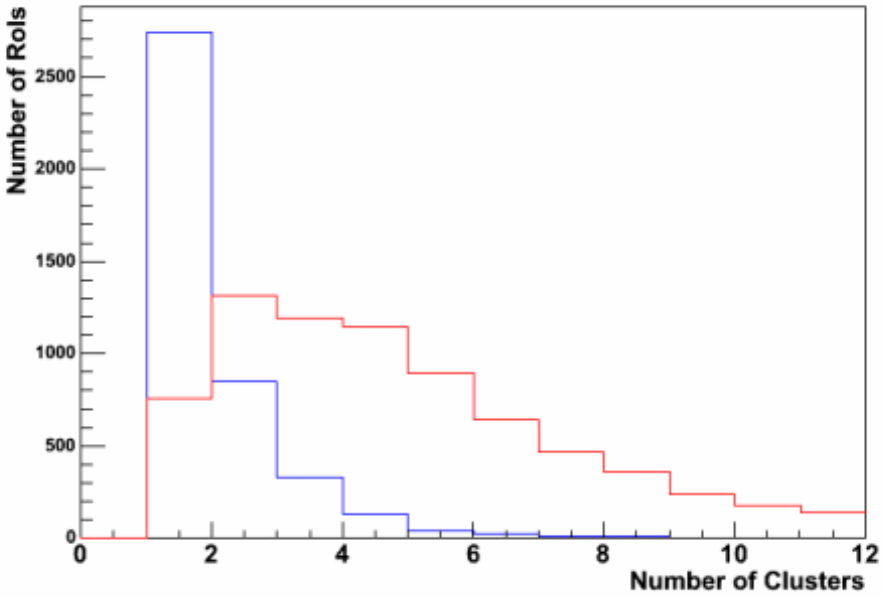
1. Selection of the EM offline clusters.

•The offline reconstruction gives

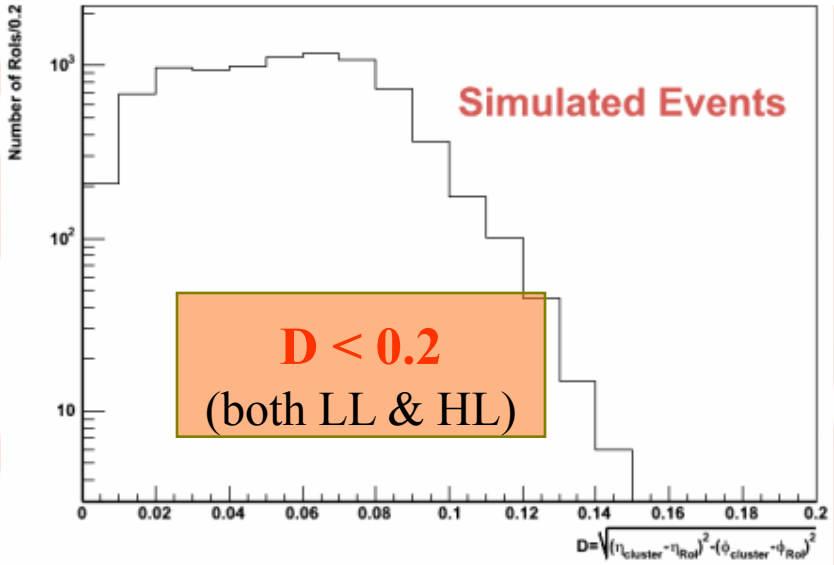
~2 clusters/RoI (LL) and ~4 clusters/RoI (HL).

•Needs a way to find the cluster to associate with the RoI.

•This is NOT going to be the case at real time: T2Calo associates ONE cluster with ONE RoI.



•Keep only the clusters which are close (in the eta-phi space) to the LVL1 RoI.



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1. Selection of the EM offline clusters.

•Reject an event if:

•more or less than one clusters are close to the LVL1 RoI.

•the final cluster-and its samplings-have unreasonable values of E,Eta,Phi.

•the final cluster has bad reconstructed energy:

Well reconstructed clusters*:

$E_T^{Rec} > 15GeV$ (LL)

$E_T^{Rec} > 20$ GeV (HL)

*Sample: single electrons with $P_T = 25$ GeV at LL and $P_T=30$ GeV at HL

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2. Defining the regions.

1. Barrel:

   $(E_{BS1}, E_{BS2} != 0)$ && $(E_{ECS1}, E_{ECS2} = = 0)$

2. EndCap:

   $(E_{BS1}, E_{BS2} = = 0)$ && $(E_{ECS1}, E_{ECS2} ! = 0)$

3. Transition

   Not in Barrel or EndCap

Constant R: R_1=1545.3 mm

R_2=1759.2 mm

Constant Z: Z_1=3766.0 mm

Z_2=3980.0 mm

Sophisticated algorithm.

- A detailed study is being carried out to optimize the algorithm in the transition region.
- For the following results, the method **was not** applied in the transition region.

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3. Statistics.

	Low Luminosity	High Luminosity
#Events reconstructed	**4,500**	**9,000**
#RoIs found	4,594	9,739
Not cluster close to RoI found:	-9	-112
More than one cluster close to RoI:	-13	-199
Selected cluster bad reconstructed:	-110	-762
Selected cluster not reasonable:	-318	-1082
#RoIs processed	**4,144**	**7,584**
Barrel:	2,299 (55.5%)	4,268 (56.3%)
Transition:	207 (5%)	283 (3.7%)
EndCap:	1,638 (39.5%)	3,033 (40%)
The method doesn't apply	**218(5.3%)**	**394(5.2%)**
Edges: (|eta|>2.4)	183(4.4%)	337 (4.4%)
Transition region		
Samplings don't point to the beam:	28 (0.7%)	46 (0.6%)
Reduced RoI has zero SP:	7 (0.2%)	11 (0.1%)

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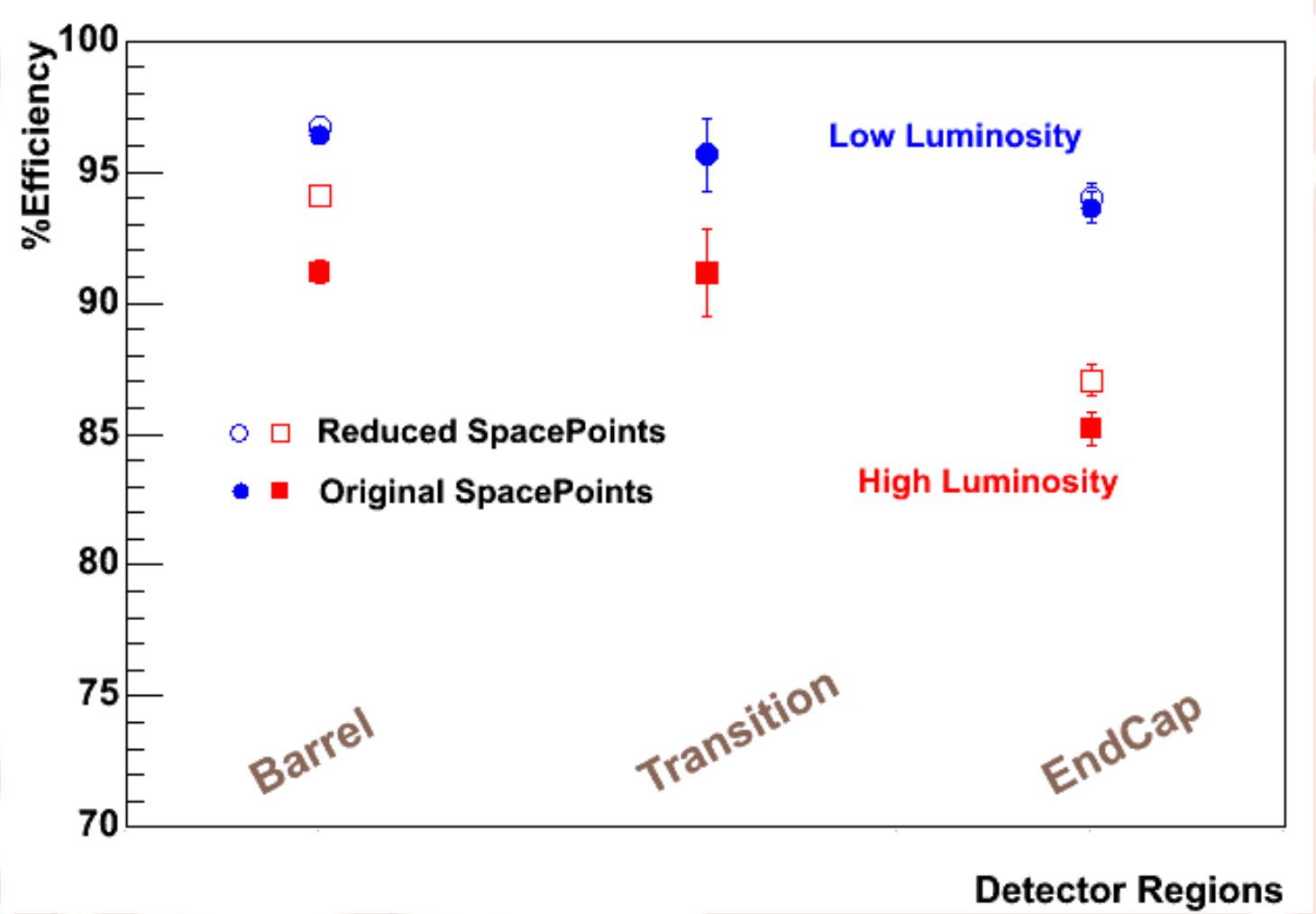
4. Results.

A. Efficiency: $|Z_{IDSCAN} - Z_{TRUE}| < 2mm$



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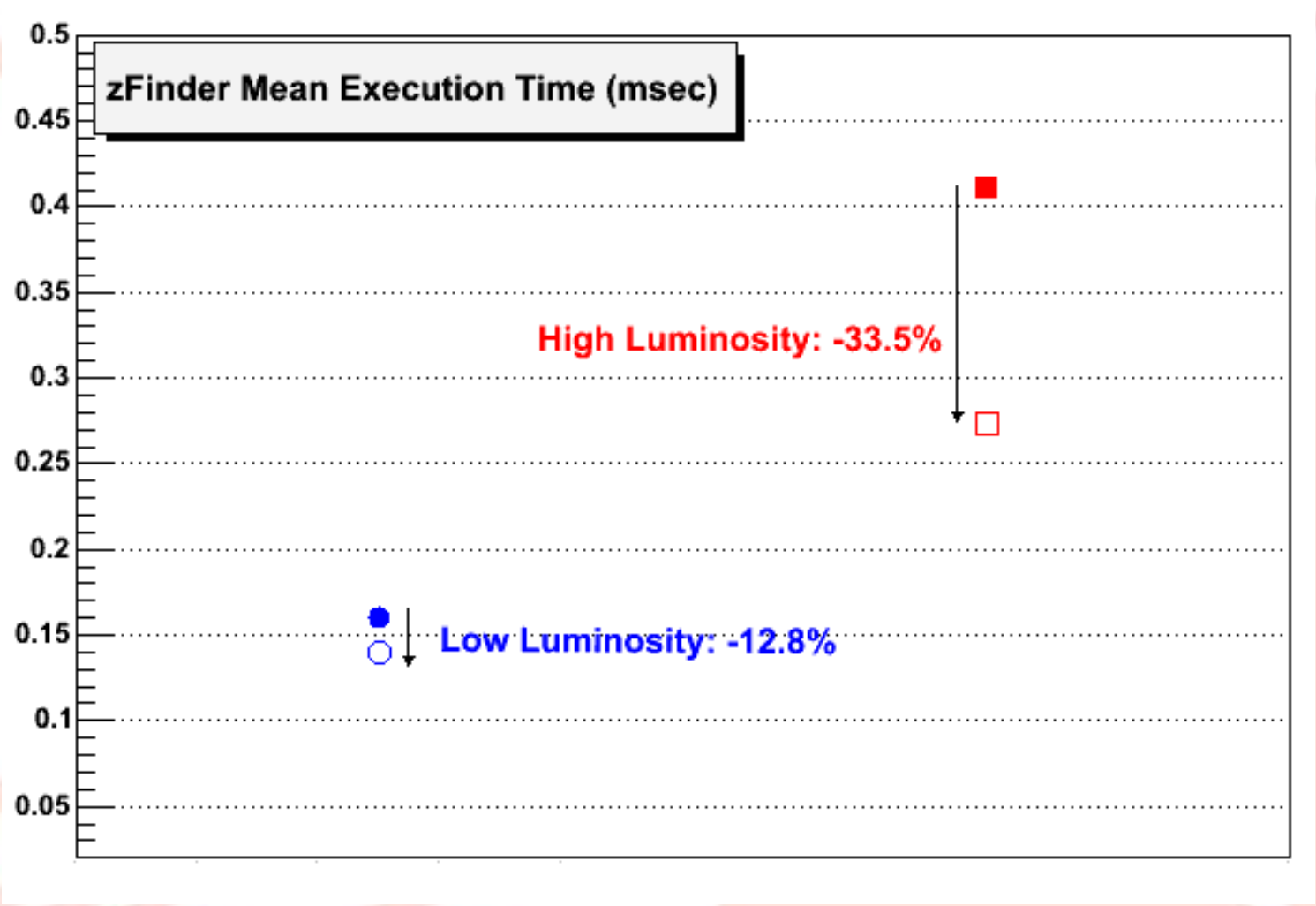
4. Results.

B. Timing: **z-finder Execution time.**



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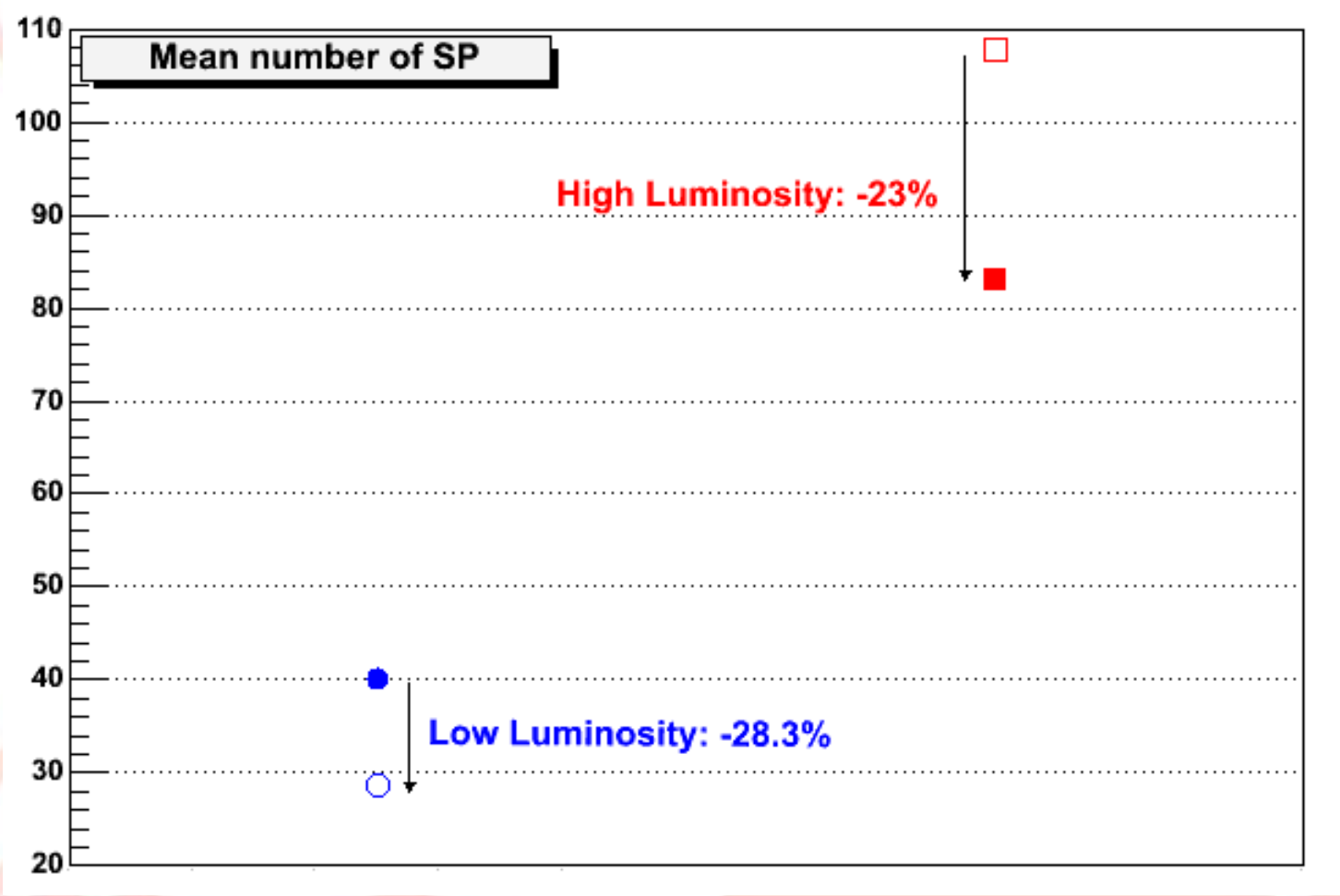
4. Results.

C . Number of SP reduction

(propotional to the algorithms' execution time).



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5. Conclusions - Next steps.

- The proposed method for optimizing the RoI size **improves** our algorithms in terms of **efficiency** and **execution time**.
- I hope the performance to become better with the T2Calo clusters.

- I've started looking T2Calo, but loads of problems with which release to use.
- Now ready to run the LL and HL samples using the **UCL farm.**
- At the same time 2 major features must be implemented:
  - Deal with the **transition region**.
  - Try to parameterize the **Shower Depth**.
  - Use the cluster resolution to form a **close shape** of the RoI.

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