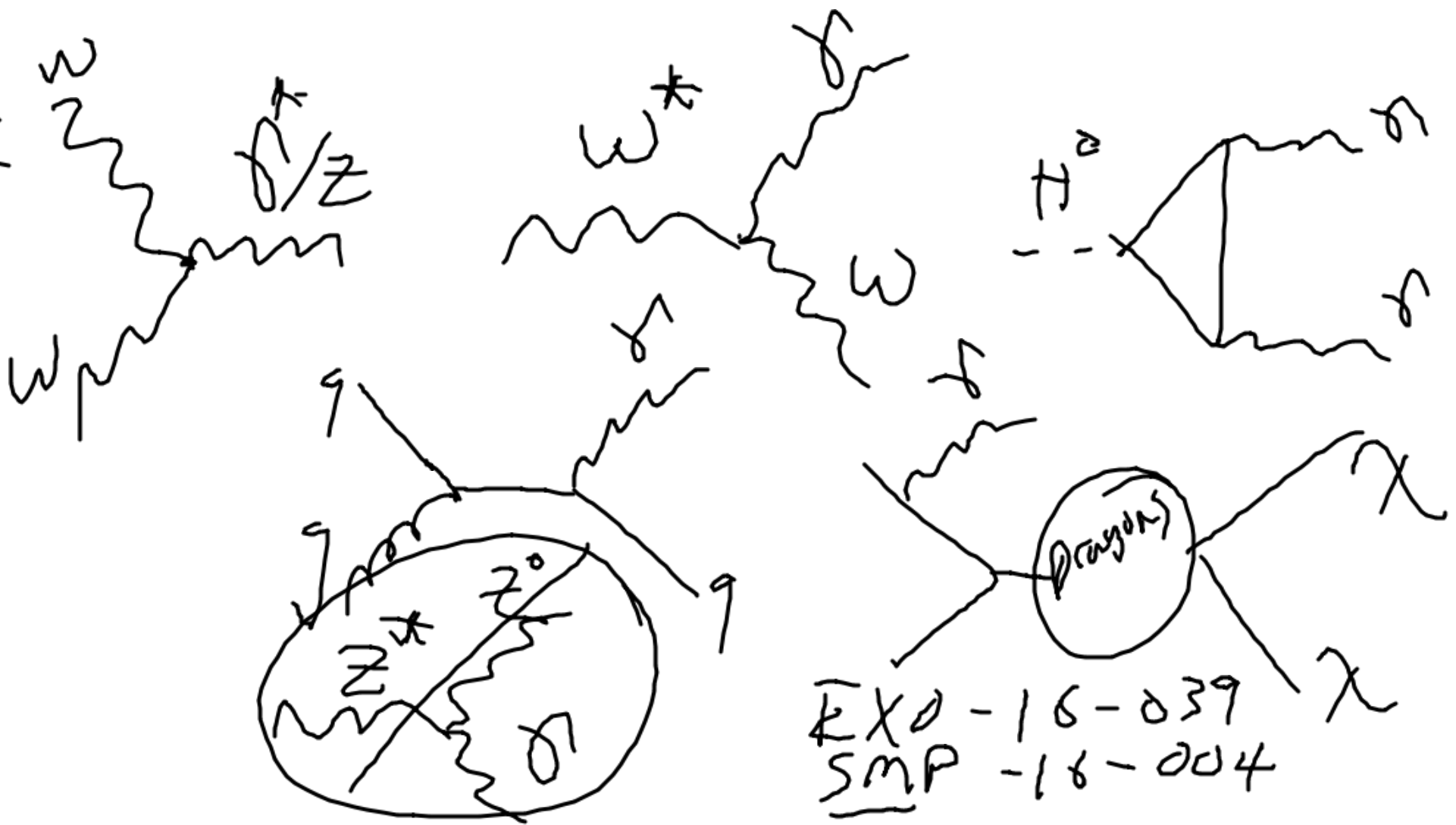




- 1.) Great
- 2.) Tricky
- 3.) Important

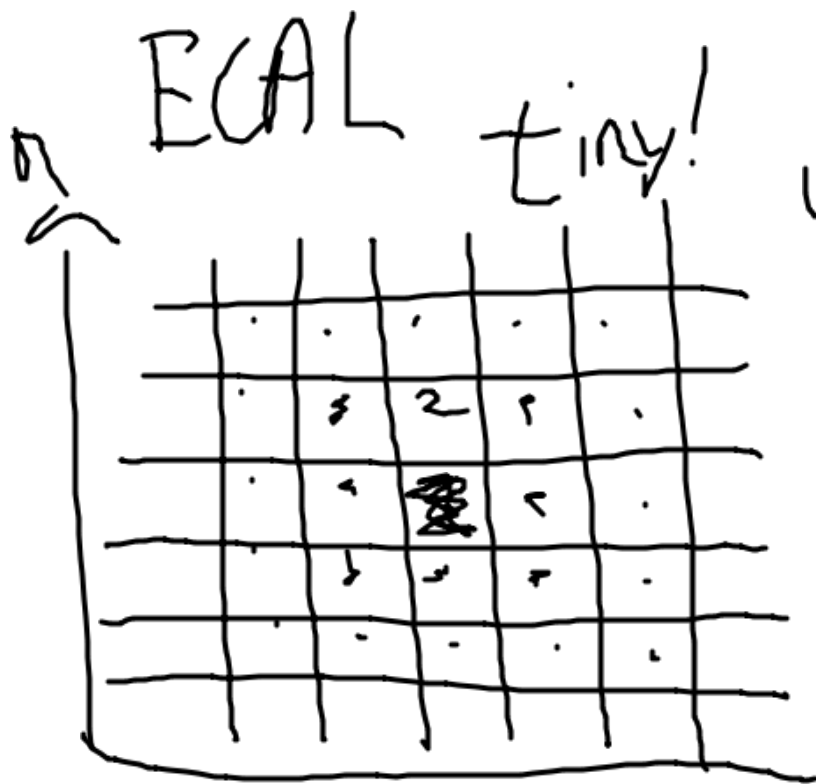
Great



EXO-16-039  
SMP-16-004

Tricky

$\gamma$  are non-redundant



uncov.  $\gamma$   
97-98%

of E is with 5x5  
array

Energy  
Spatial dist.

Timing

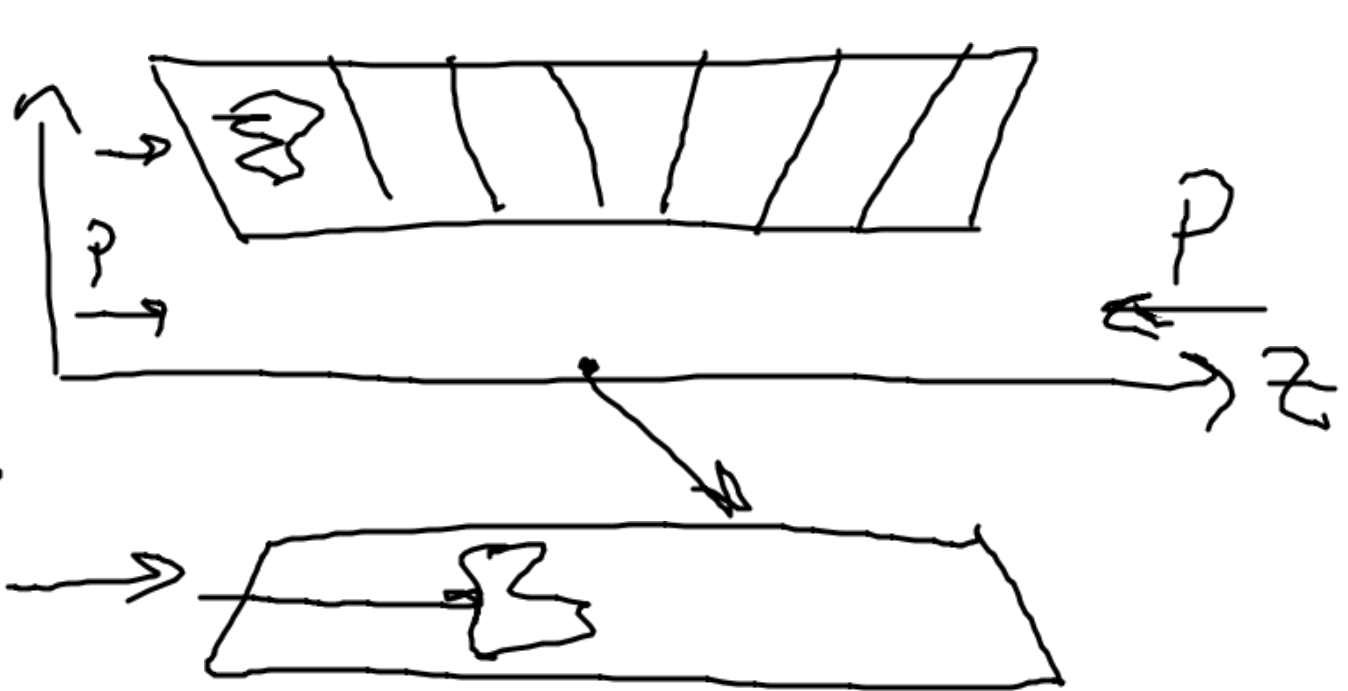
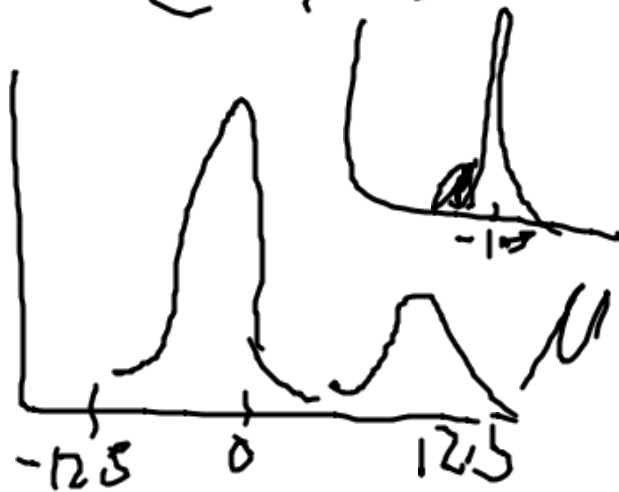
61,200 barrel  
crystal

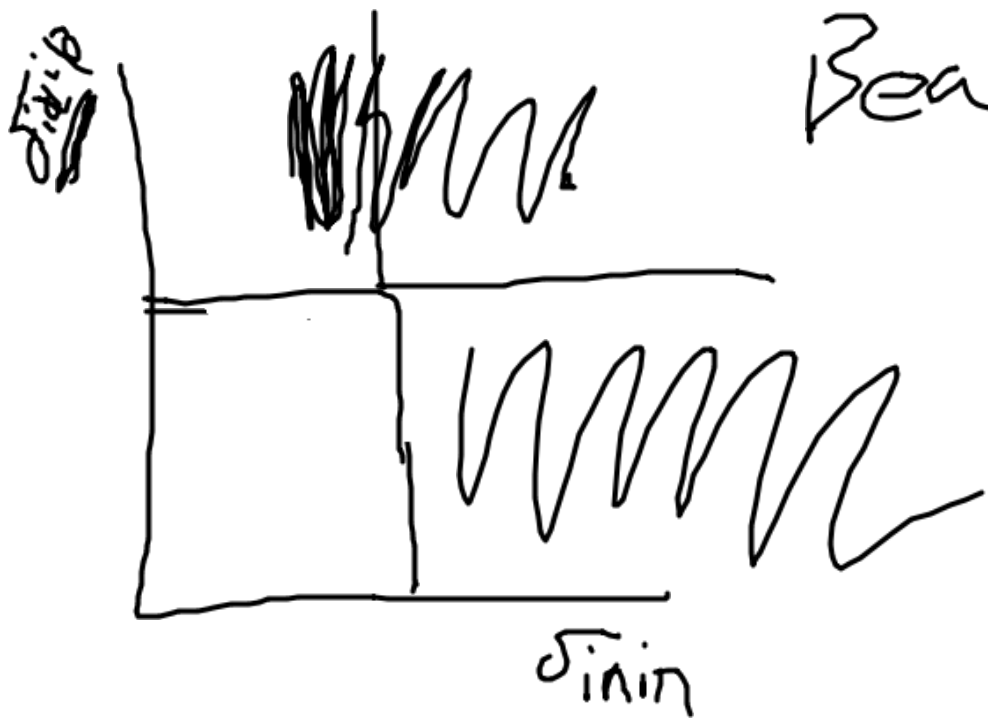
$\phi$

Beam and instrumental bkg

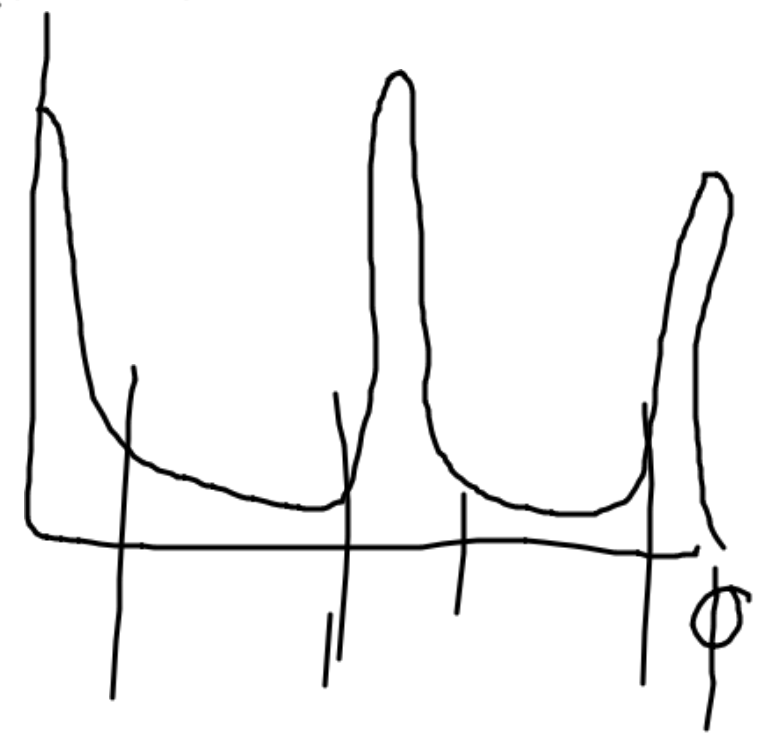
$\sigma \rightarrow \delta$

$e \rightarrow \delta$

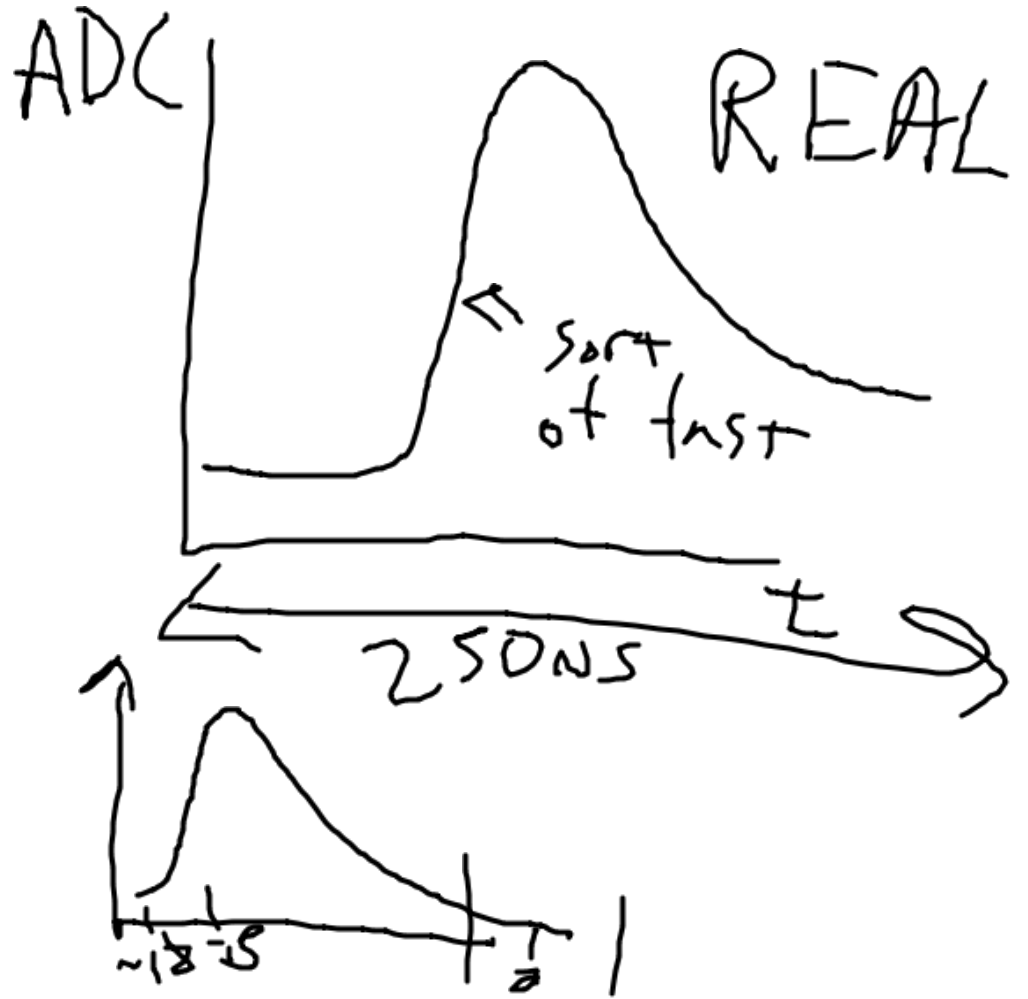


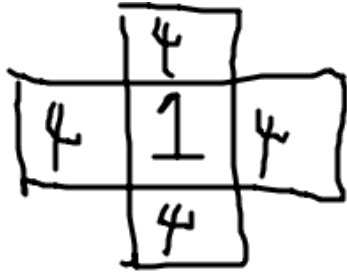


Beam Halo



# Spikes





$$1 - \frac{S_4}{S_1} < X$$

Isolated case

, L2 FGVB

HLT Swiss  
Cross



Exp  
423 ± 39

400 candidates  $E_T^{\gamma} > 175$

215 ± 32  $Z \rightarrow \nu \nu \gamma$

57 ± 8  $W \rightarrow l \nu \gamma$

54 ± 3  $W^* \rightarrow e \gamma$

27 ± 13 spikes

15 ± 11 halo

54.6 ± 8 others

ICHEP

2016

~ 12.9 fb<sup>-1</sup>





$$M_{X^\pm} - M_{X^0} = \text{small}$$

arXiv 1401.1162

$Z + \delta/j$  floor

arXiv:1605.00658

ISR boost + FSR

ISR can play important role.

→  $\beta$  are great because  
we can set a lower  
threshold

→  $\beta$  are great because of  
precision