Electromagnetic Calorimeter Performance at 132ns and 396ns Bunch Spacing

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Important B decay Modes

$B^0 \rightarrow (\rho\pi)^0 \rightarrow \pi^+\pi^-\pi^0$

The cleanest way to extract α in the unitary triangle

$B_s^0 \rightarrow J/\psi\,\eta\,,\ J/\psi\,\eta'$

$B^0 \rightarrow K^*\gamma\,,\ \rho^0\gamma$

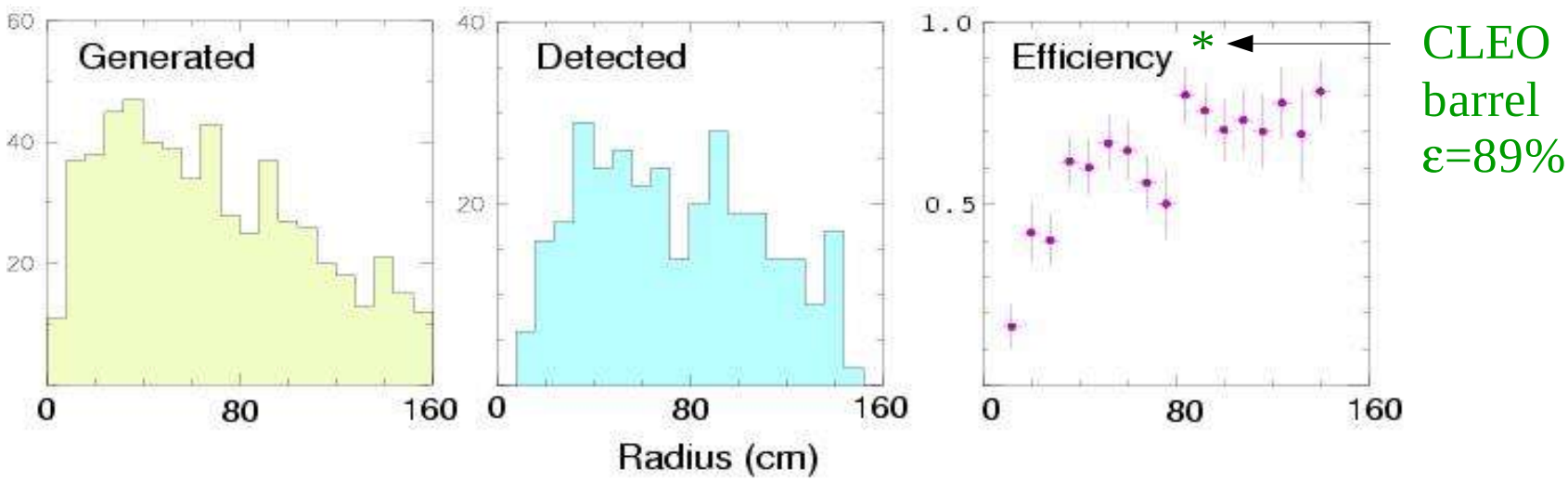
Expected Performance

$\sigma(E)/E = 1.7\% / \sqrt{E} \oplus 0.55\%$ $\sigma(x) = 2770\mu m / \sqrt{E} \oplus 170\mu m$

Reconstruction of γ's

- Clustering algorithm
- Partition of showers overlap
- ``fine'' corrections
- Charged hadrons rejection
- More sophisticated handling of showers overlap underway

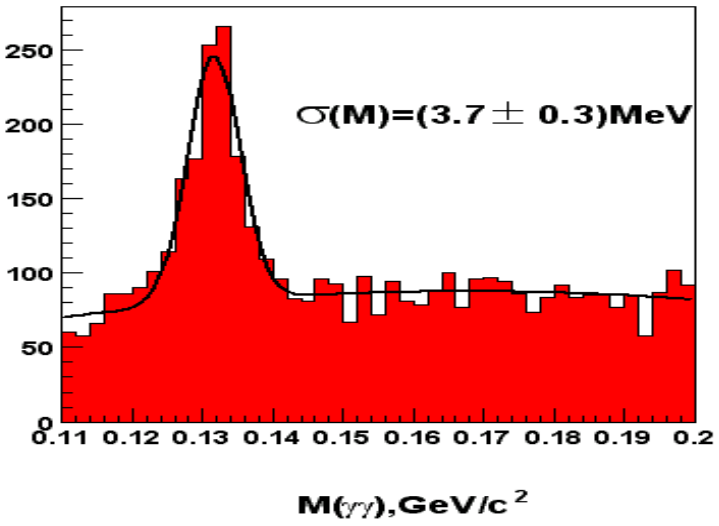
Generated and detected γ's from $B^0 \rightarrow K^*\gamma$ (G3+rec.tools)

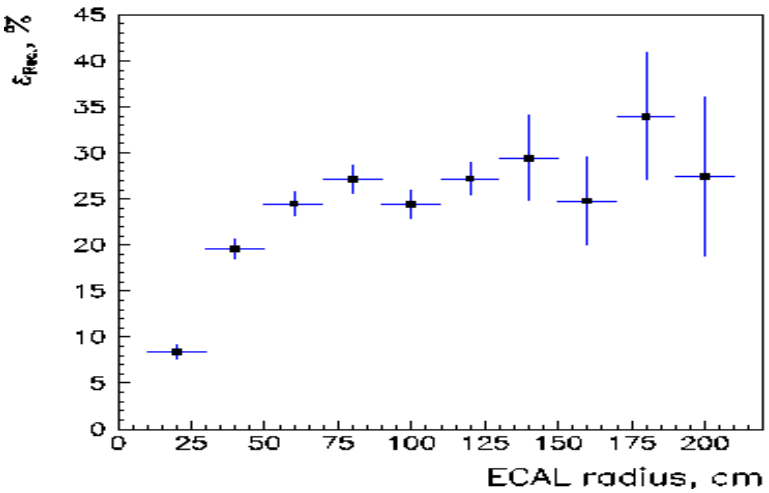


Expected Performance at 132ns

Reconstruction of π^0's from $B^0 \to \rho^+ \pi^-$

Sample contains mean=2 Poisson distributed min bias

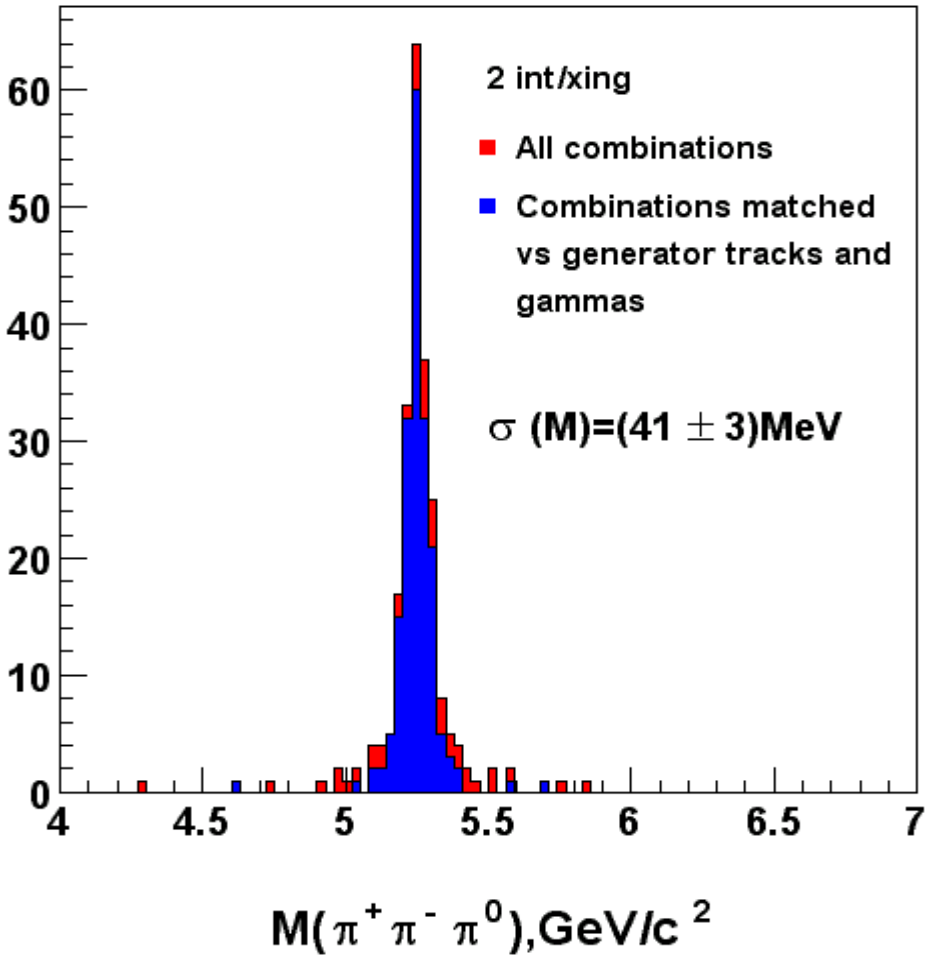




- $(E9/E25)_\gamma > 0.85$
- $E(\gamma) > 1GeV$
- No footprint of charged track within 2cm from COG of γ
- $E(\gamma\gamma) > 5GeV$
- $pt(\gamma\gamma) > 0.75GeV$

Expected Performance at 132ns

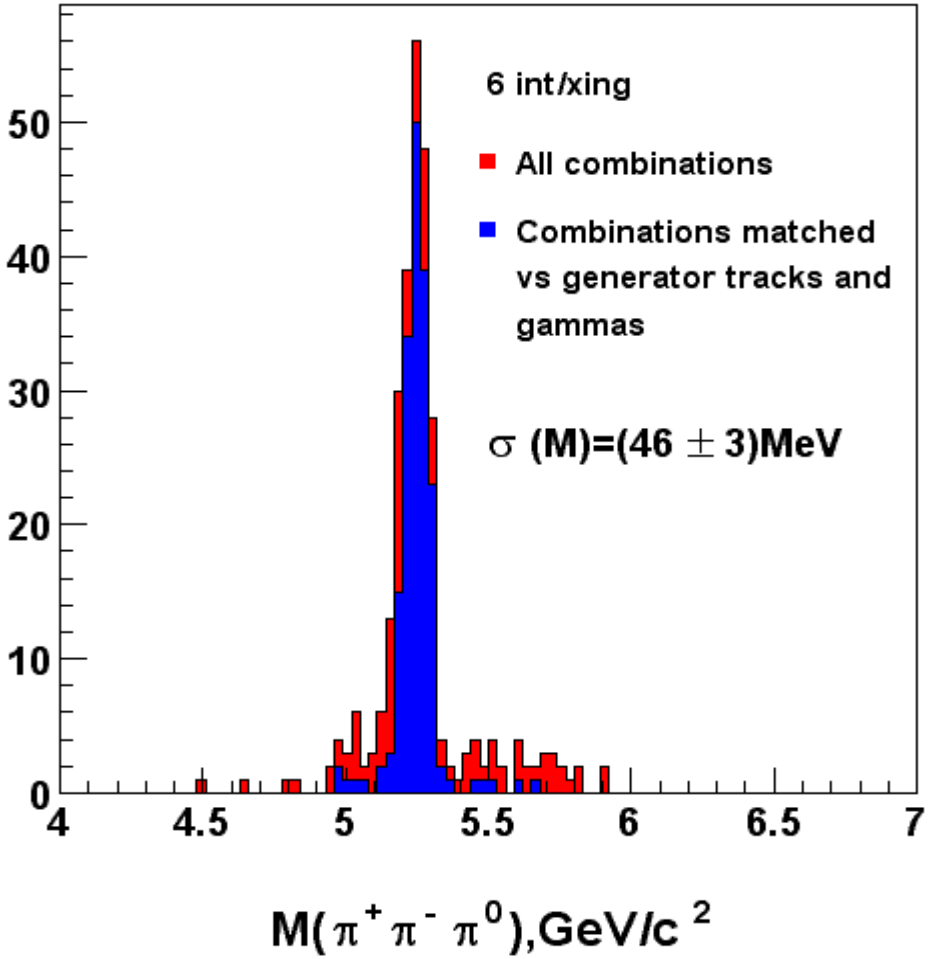
Reconstruction of $B^0 \to \rho^+ \pi^-$



- B-mass plot is for events in which charged particles and $\gamma\gamma$-pairs pass all cuts
- Reconstruction efficiency is $(0.22 \pm 0.02)\%$
- Signal/Background = 4:1

Expected Performance at 396ns

Reconstruction of $B^0 \to \rho^+\pi^-$



Reconstruction technique and analysis approah as before

B-mass resolution practically the same within errors

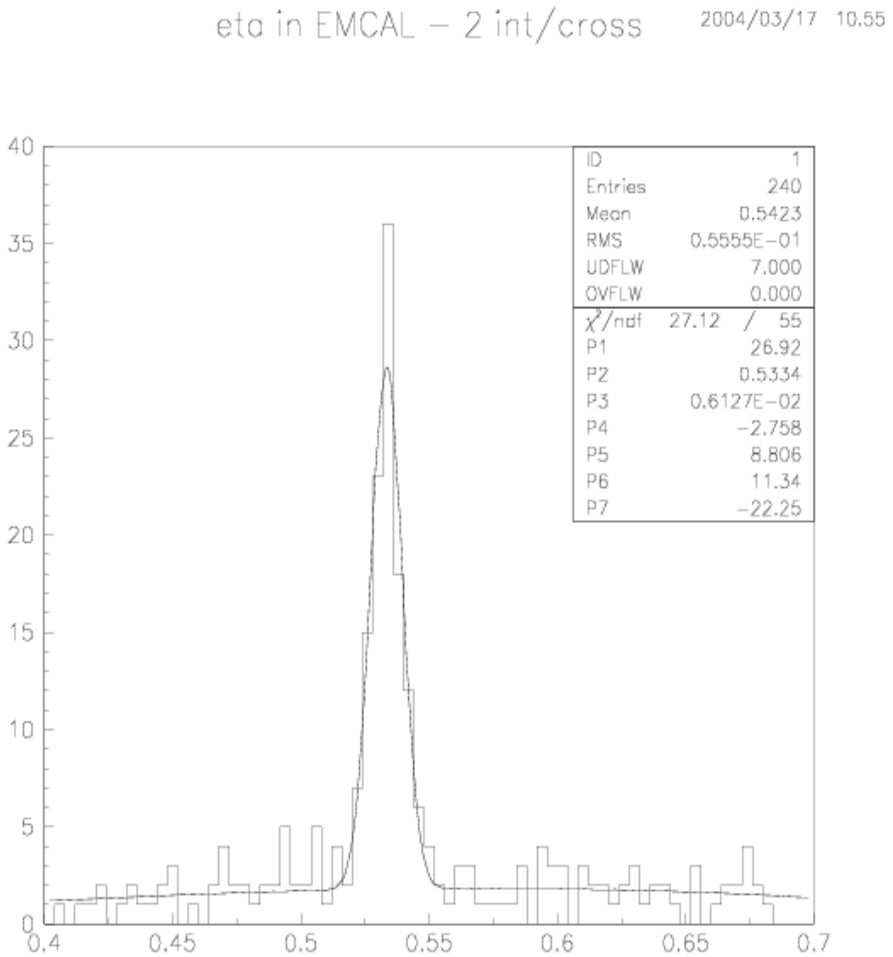
Reconstruction efficiency decreases slightly to (0.18±0.02)%

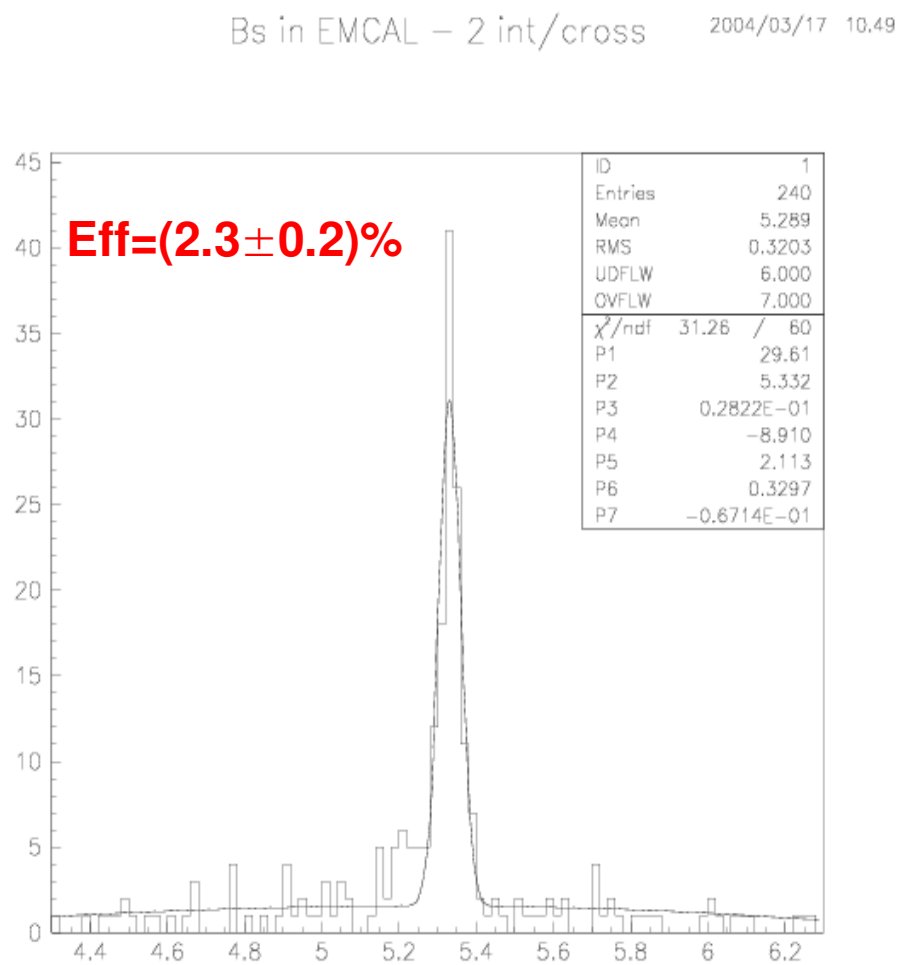
Additional wrong entries sneak through selection cuts

Background at 6int/xing may increase by a factor ~1.5

Expected Performance at 132ns

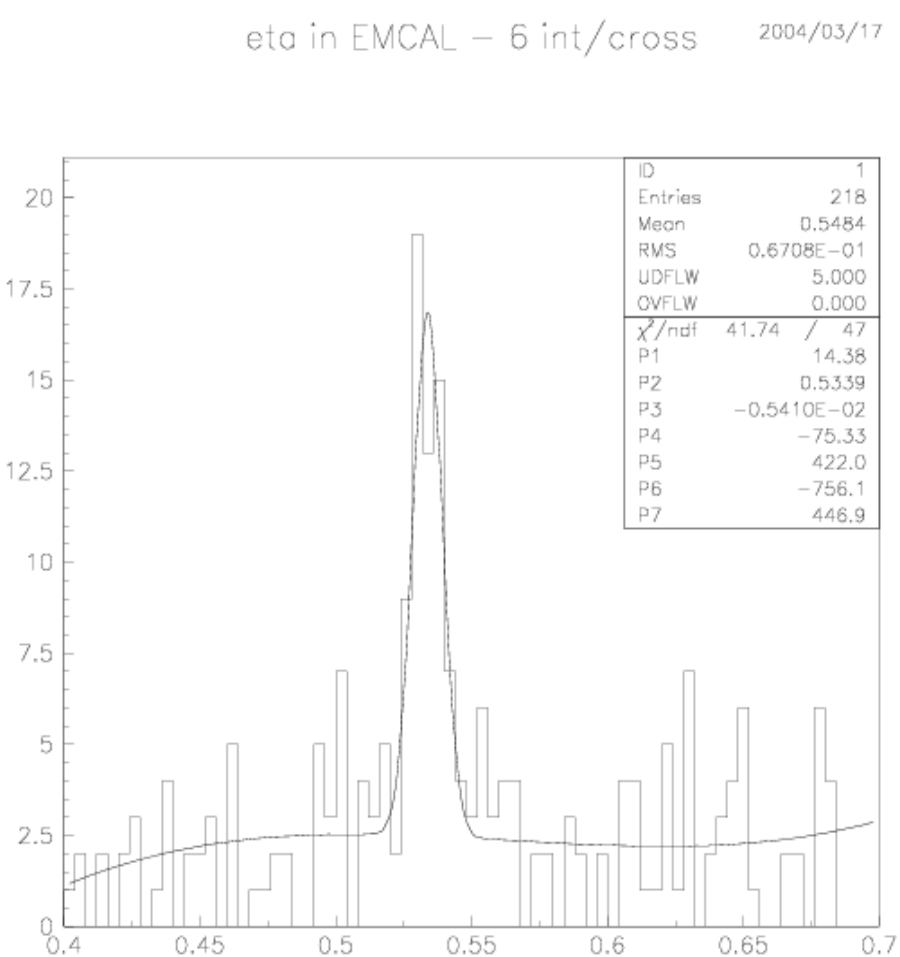
Reconstruction of B_s -> $J/\psi\ \eta$ (4250evts)

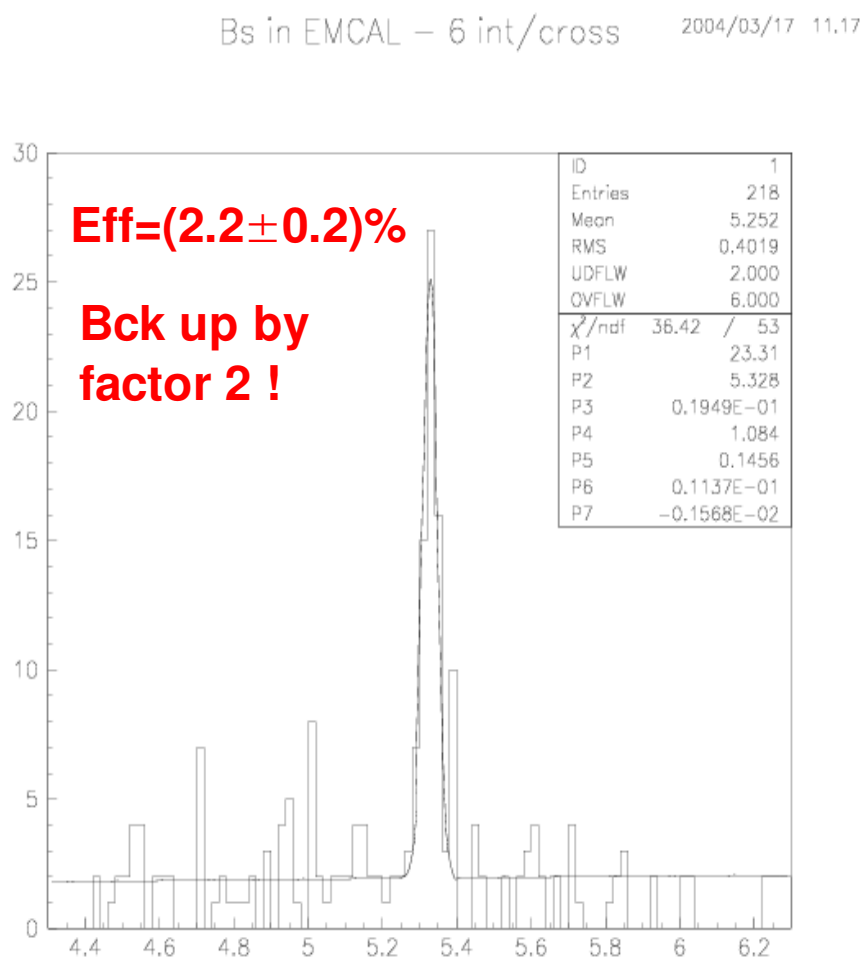




Expected Performance at 396ns

Reconstruction of B_s -> $J/\psi\ \eta$ (2250evts)





Summary

- MC study has been done to evaluate EM Calorimeter performance if running at 396ns bunch spacing, for $B^0 \to \rho^+\pi^-$ and $B_s \to J/\psi\,\eta$ decay modes
- The detector is expected to work well at 396ns
- Some aspects of the detector operation will require more carefull attention if running at 396ns