

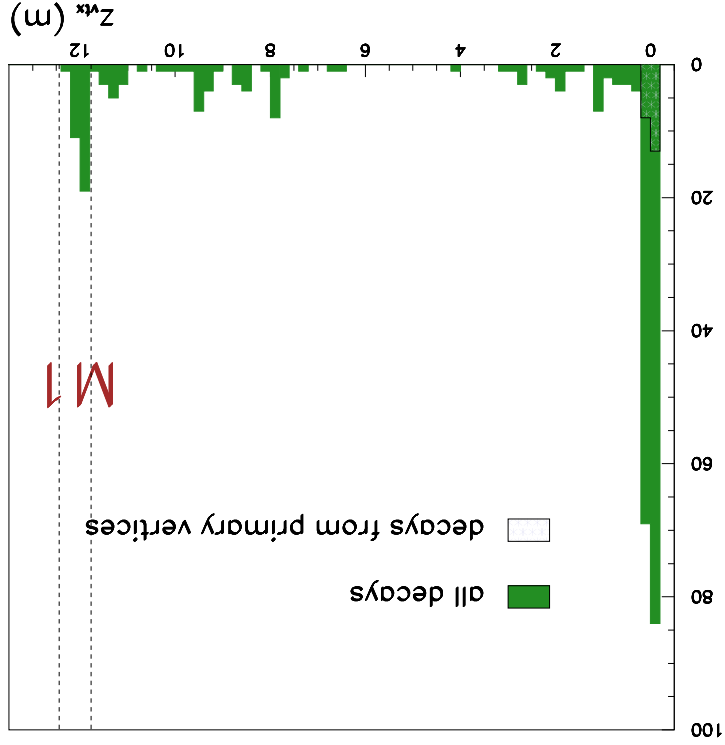
Impact of M1 on the Calo Trigger

Eduardo Rodrigues
CERN

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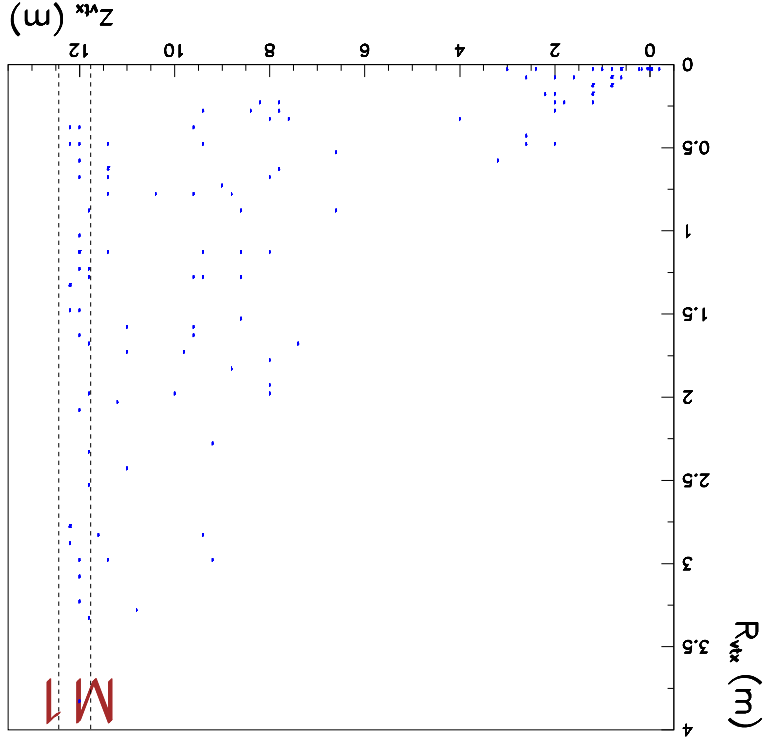
- How M1 affects the recognition of (triggering) electrons at L0
- Can the L0 electron trigger gain from the removal of M1?

EFFECT ON MINIMUM BIAS EVENTS



Procedure:

- match the triggering L0 electron candidate to a MC particle
- look at the MC PID, it's mother's PID and z-position of origin vertex



- several detector components clearly seen
- peak due to interaction in M1 is prominent
- (origin of large peak around the IP?)

EFFECT ON MINIMUM BIAS EVENTS (II)

○ From the region near the IP:

- ✓ most MC matches have $R_{vtx} < 5$ mm
- expected
- ✓ mainly due to π^0 and η decays
- ✓ L0 e-trigger misidentifies a large fraction of these photons

→ why ...?

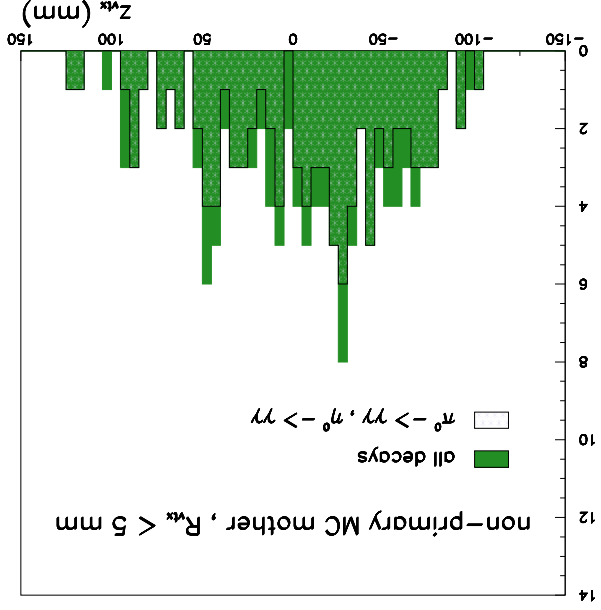
○ In M1:

- ✓ $\approx 10\%$ of all the e-trigger MC matches originate from M1!

What can L0 gain from the removal of M1?

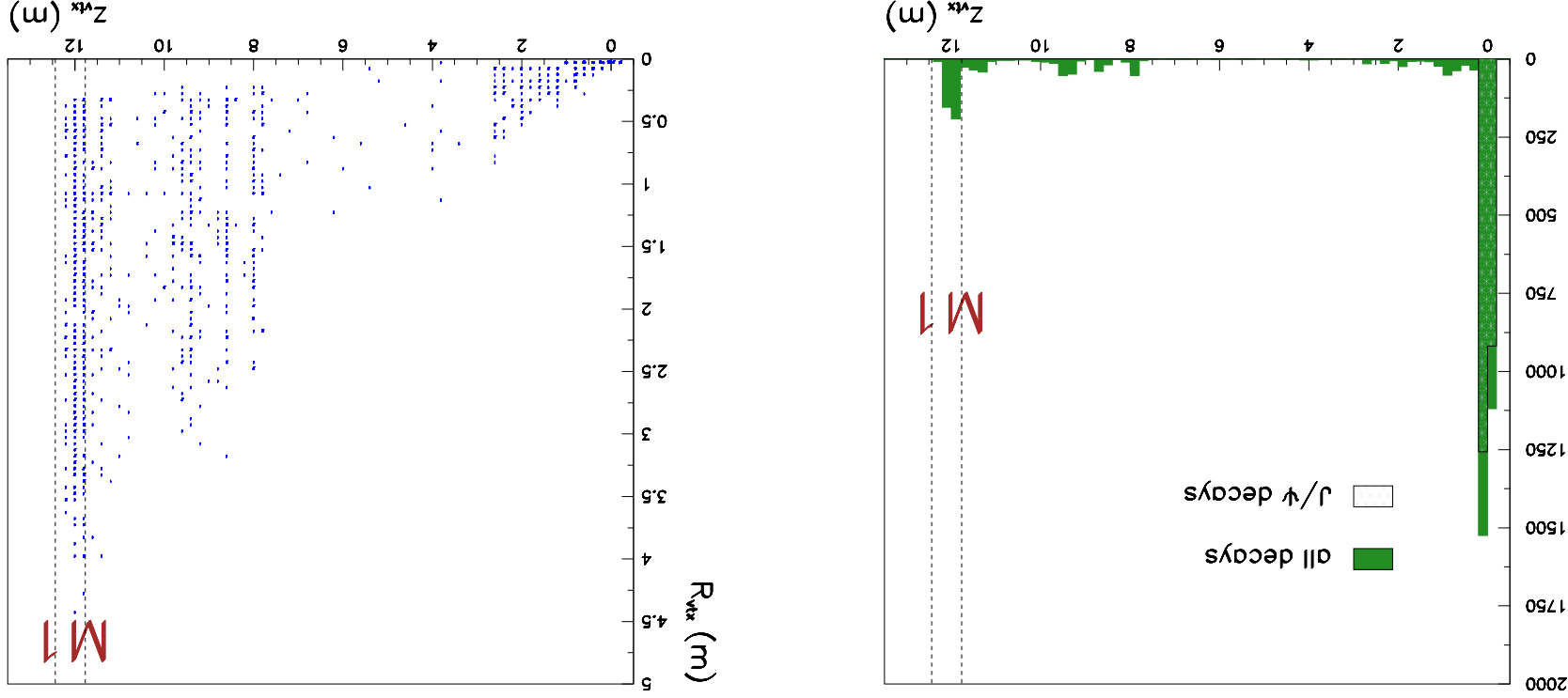
- ▶ loss in μ -trigger efficiency can be recovered?
- ▶ how are the signal rates at L0 affected?

⇒ re-tune the L0 E_T thresholds (removing the electrons with MC matches from M1) to give a first impression ...



EFFECT ON $B_d \rightarrow J/\psi(e^+e^-) + K_S$ EVENTS

- Before the re-tuning ...



- interactions in M1 (mainly γ conversion and bremsstrahlung) also help triggering:

✓ 10% of all the e-trigger MC matches originate from M1!

(e.g. in a $\gamma \rightarrow e^+e^-$ conversion, the detected electron can trigger whereas the original γ would not so often, because of the significantly higher E_T threshold)

OBSERVATIONS AND OUTLOOK

○ After re-tuning:

- rate is recovered, as expected
- L0-accept rates for various signal channels can increase by at most a few percent
- More detailed study would require samples without M1 ...

○ Outlook:

- More work needed for a clear statement to be made ...
- But first impressions indicate a small impact (a few percent) on the L0 efficiency for various signal channels