Impact of M1 on the Calo Trigger

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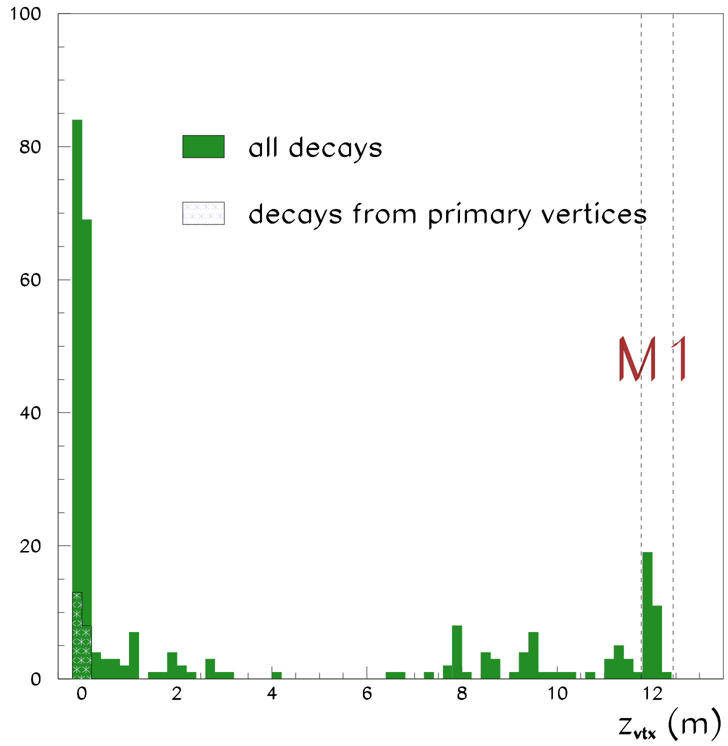
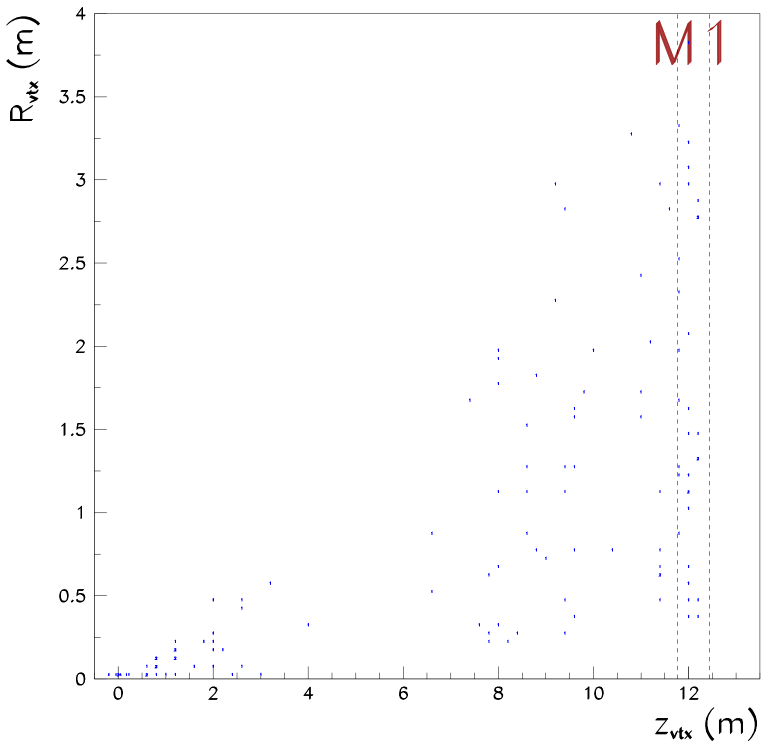
LHCb Collaboration Meeting, Cambridge
18^{th} September 2002

- 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:

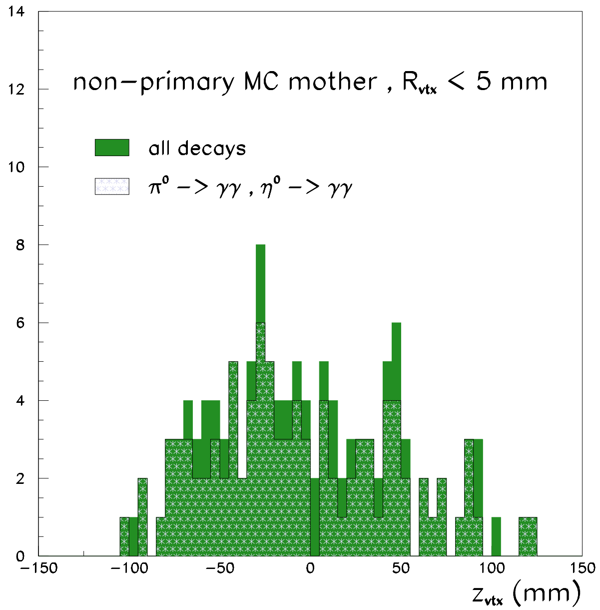
- match the triggering L0 electron candidate to a MC particle
- look at the MC PID, it's mother's PID and z-position of origin vertex

- 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?

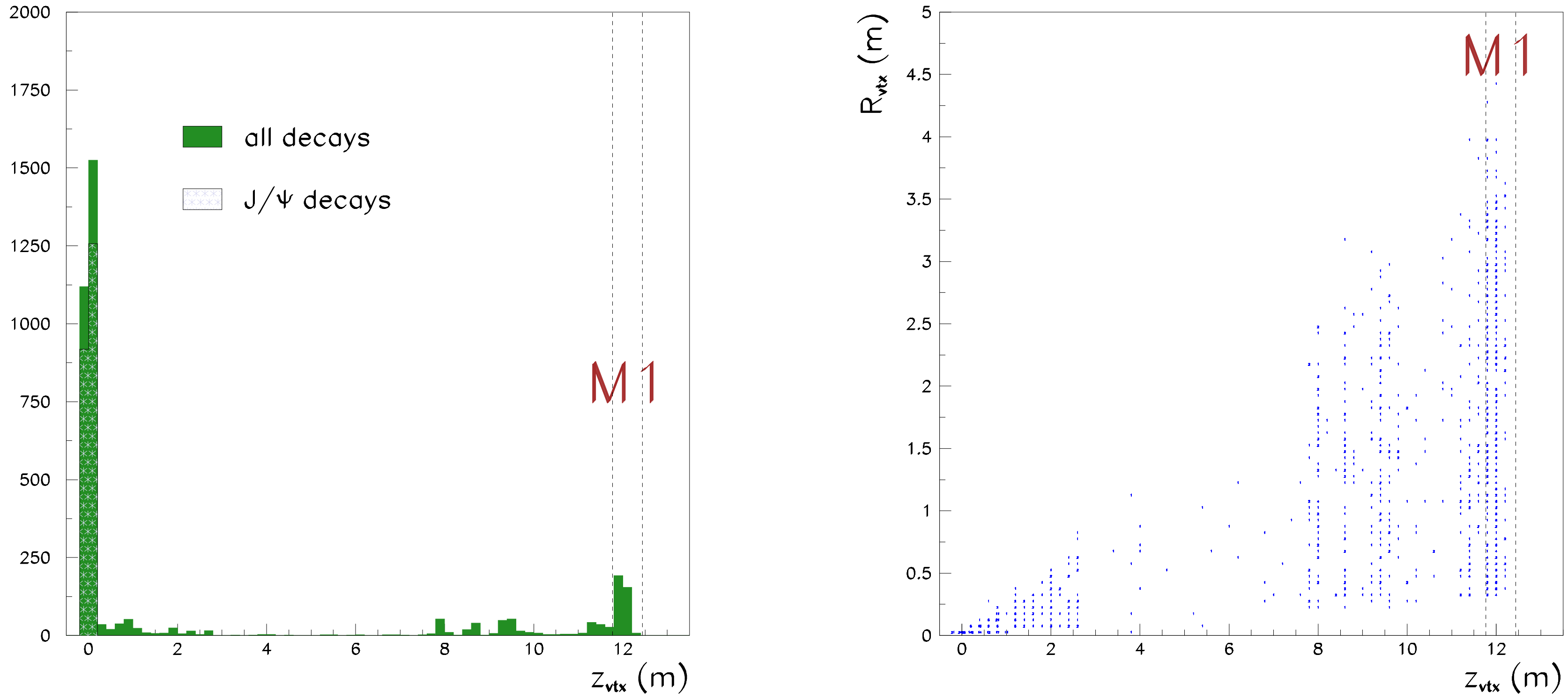
▶ loss in μ-trigger efficiency can be recovered?

▶ 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 $B_d \to J/\Psi(e^+e^-) + K_S$ EVENTS

- Before the re-tuning ...



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

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

  (e.g. in a $\gamma \to e^+e^-$ 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