

# Photon induced background in LHCb DY measurements

Laurent Favart

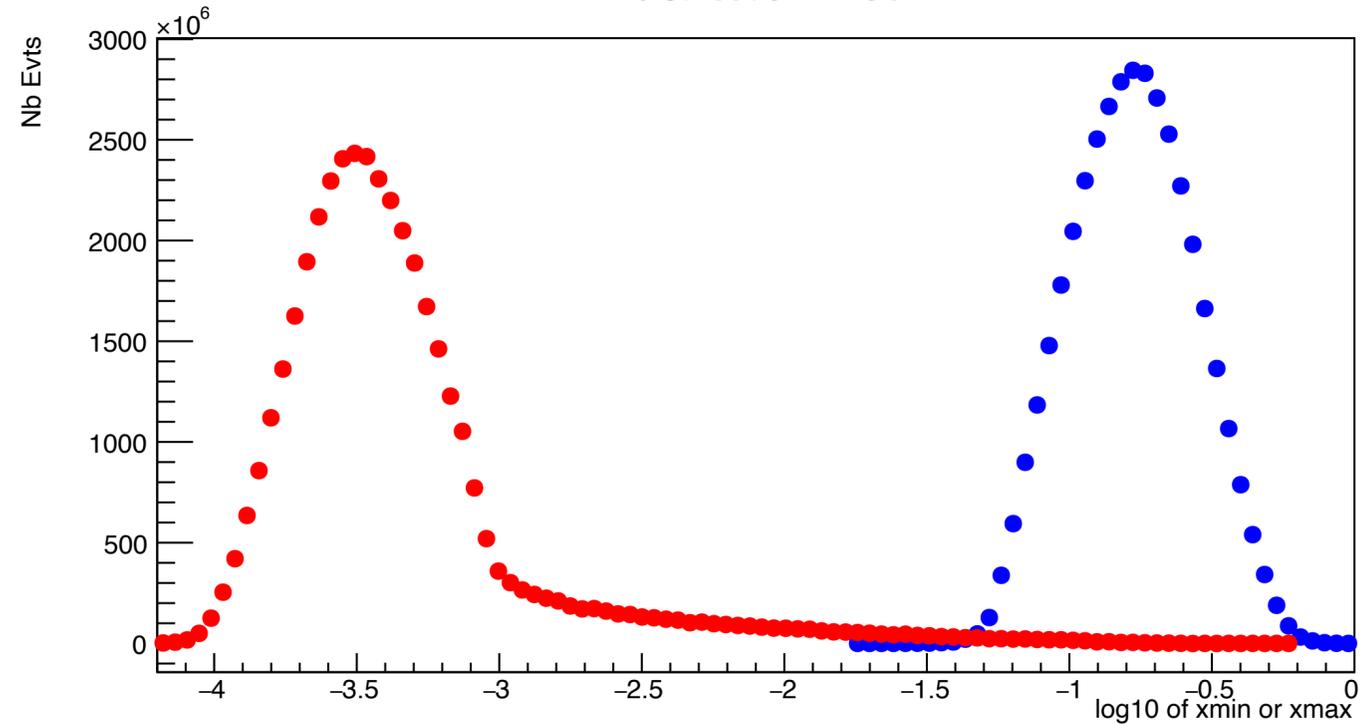
TMD meeting

27th Feb. 2026



# Reminder: LHCb vs CMS fiducial spaces

x distribution LHCb

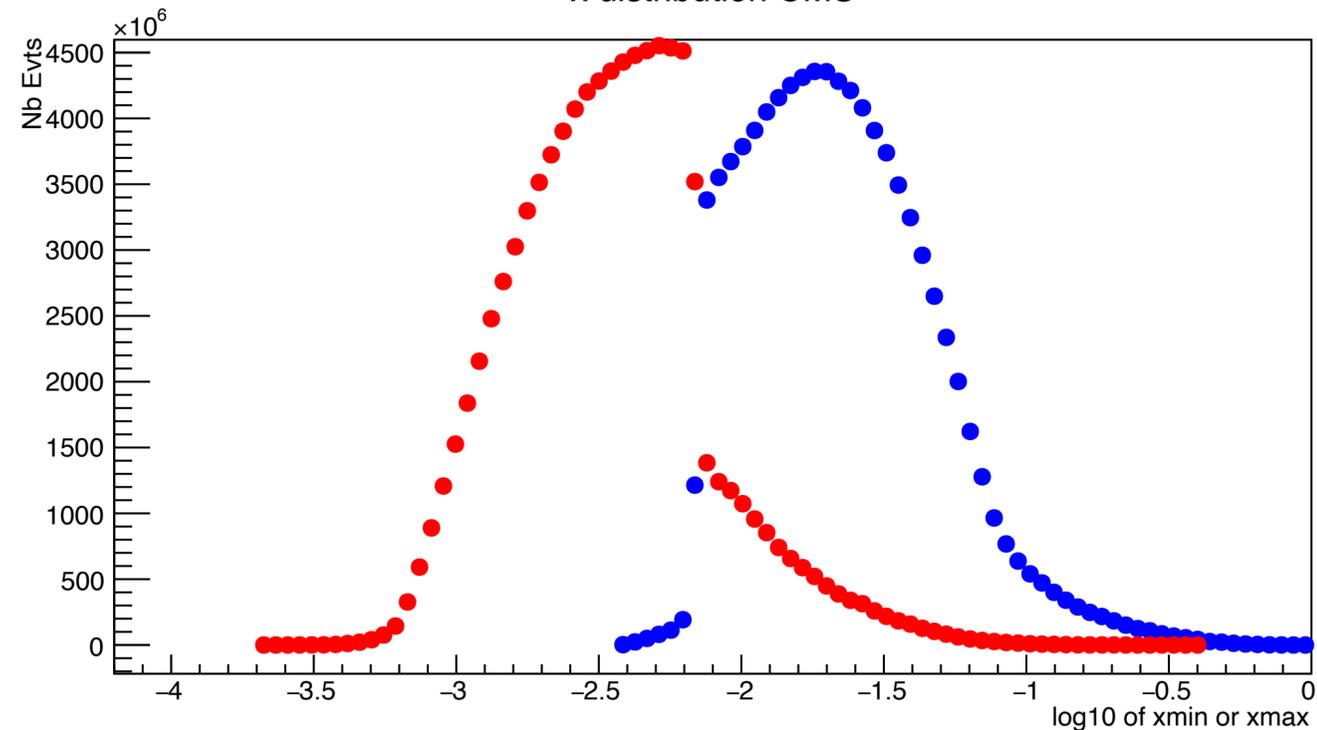


LHCb - 13 TeV [[arXiv:2112.07458](https://arxiv.org/abs/2112.07458)]

$$60 < M_{\mu\mu} < 120 \text{ GeV} \ \&\& \ P_T > 20 \text{ GeV} \ \&\& \ 2.0 < \eta_{\mu} < 4.5$$

$$\int_{fid} d\sigma = 196 \text{ pb}$$

x distribution CMS

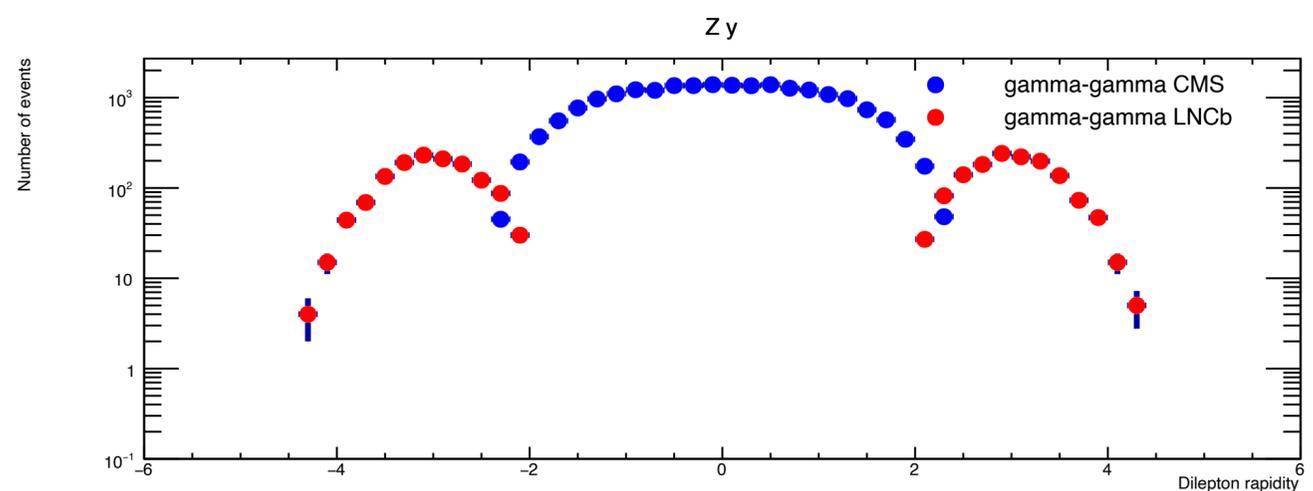
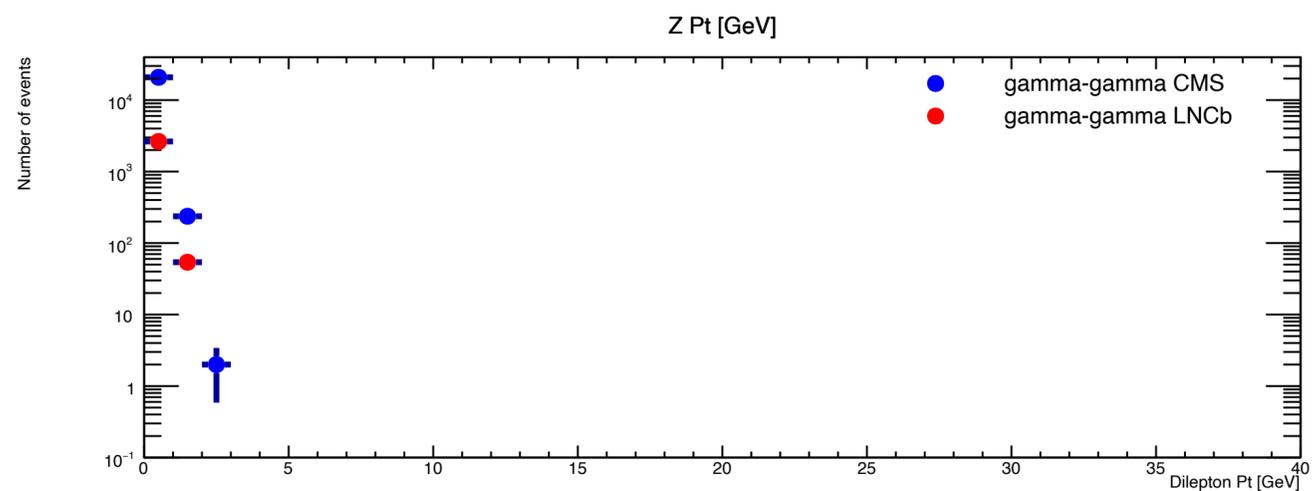
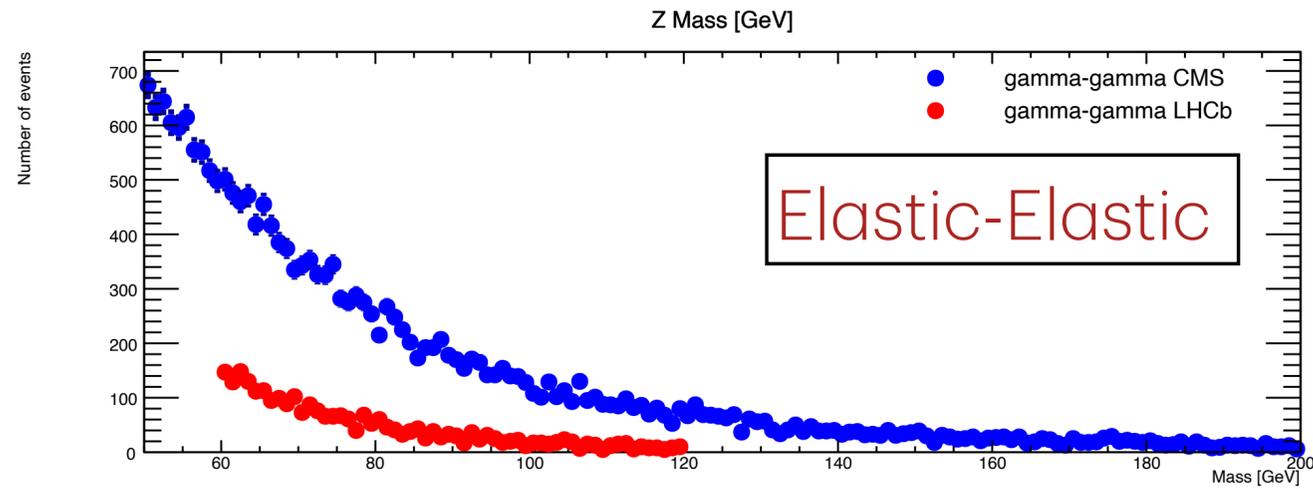


CMS - 13 TeV [[arXiv:2205.04897](https://arxiv.org/abs/2205.04897)]

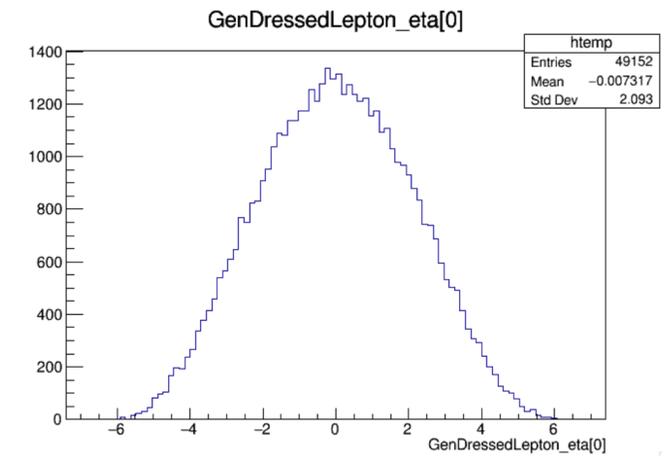
$$50 < M_{\mu\mu} < 10000 \text{ GeV} \ \&\& \ P_T > 20/15 \text{ GeV} \ \&\& \ |\eta_{\mu}| < 2.4$$

$$\int_{fid} d\sigma = 1977 \text{ pb}$$

# Is photon induced background in LHCb measurement negligible ?



We generated (thanks Bugra) an LPAIR MC sample including large lepton rapidities

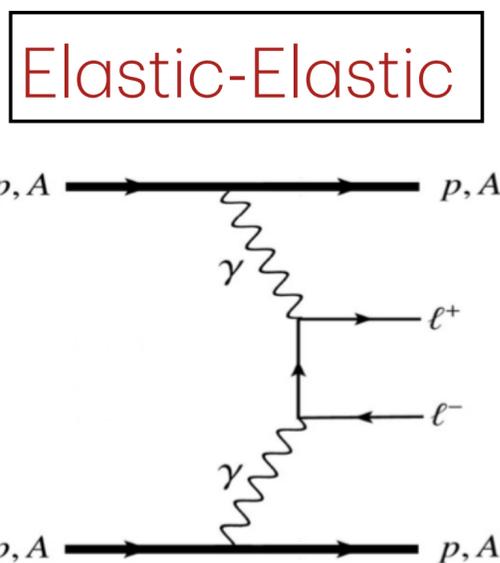


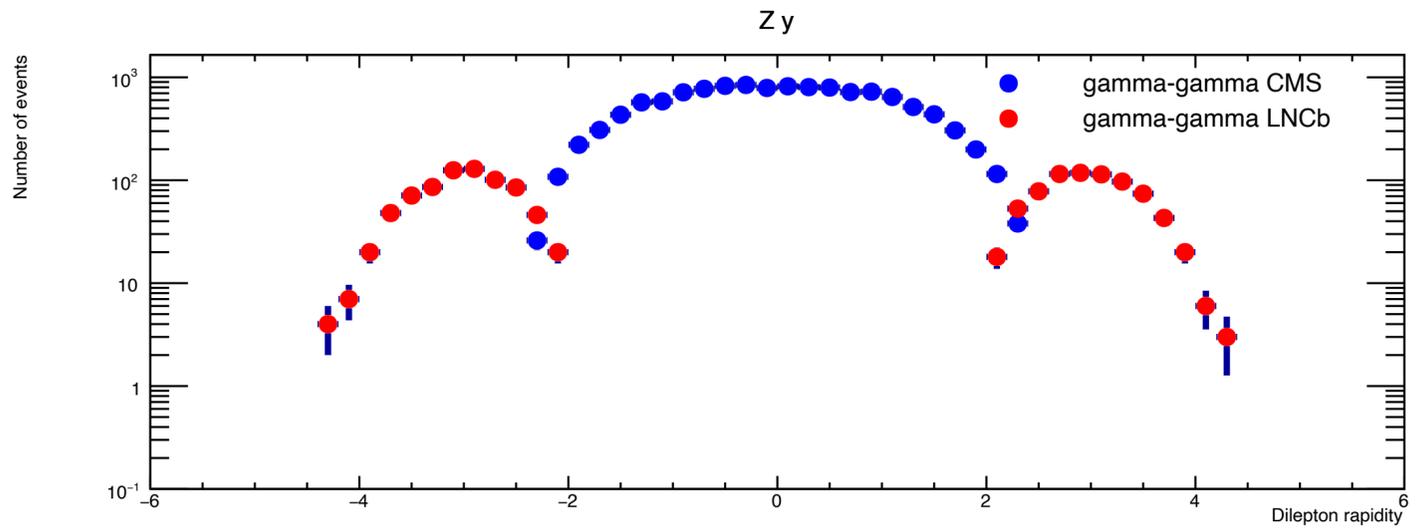
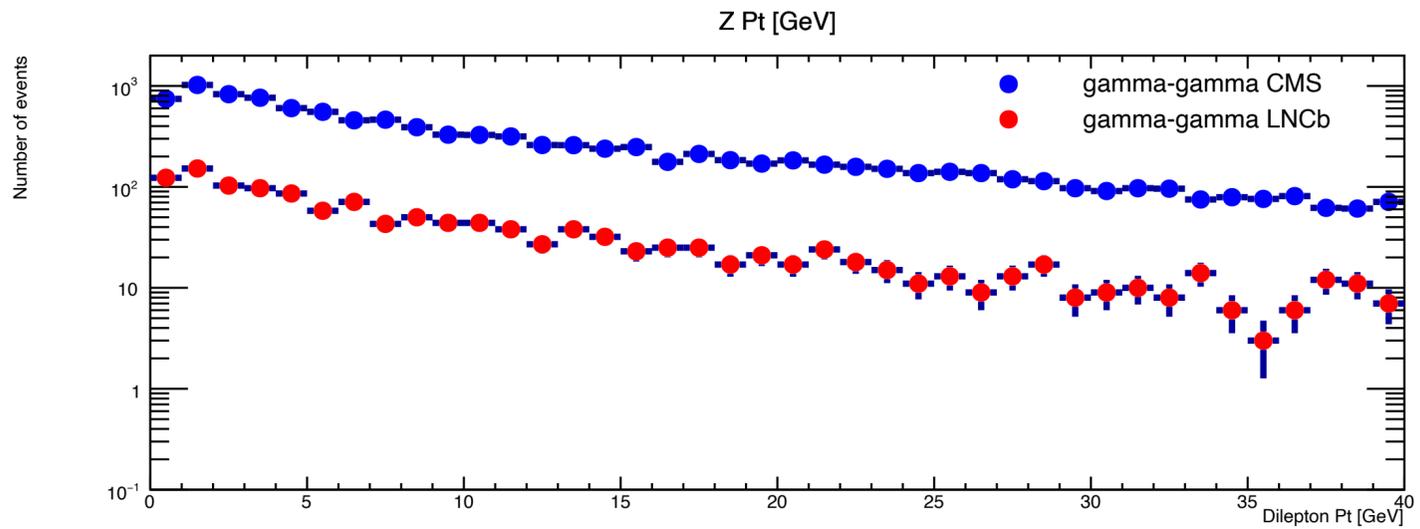
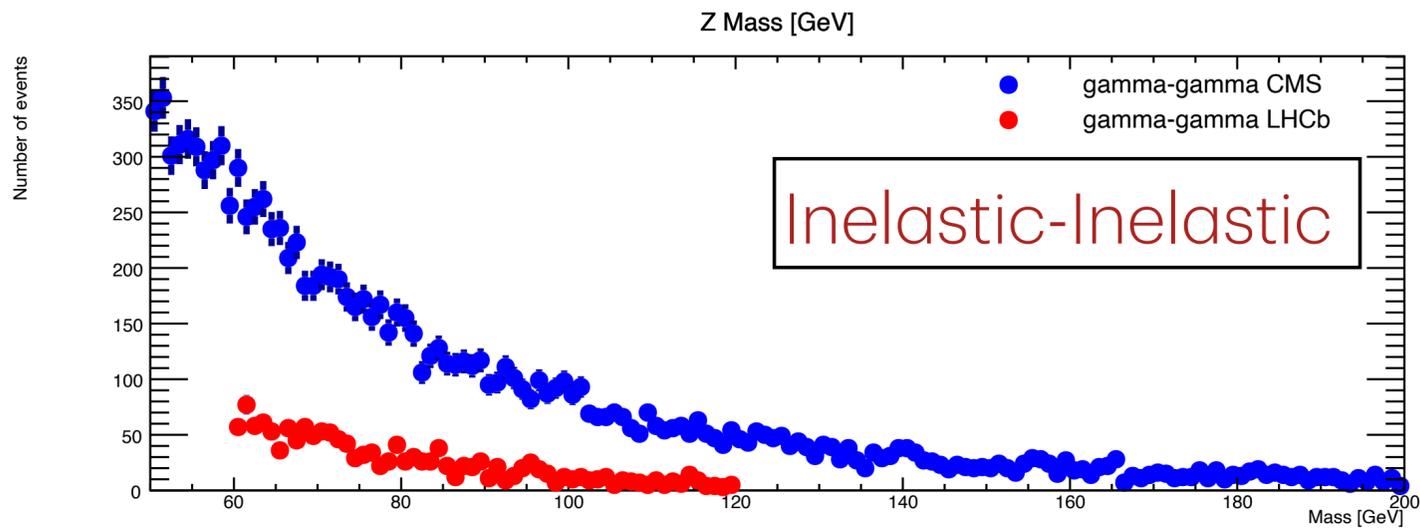
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CMS - 13 TeV

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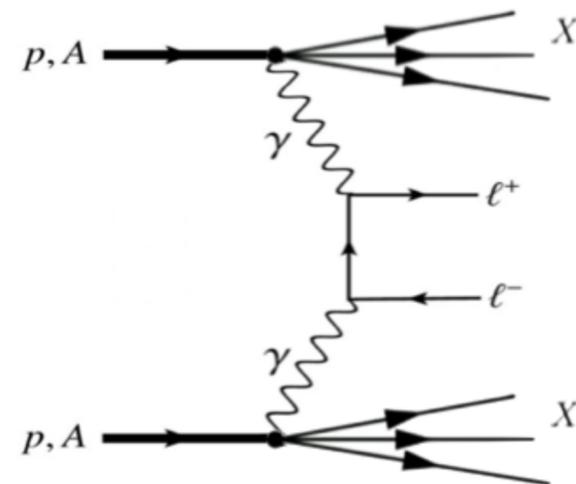




The  $\gamma\gamma$  cross section falls down with the lepton pair rapidity.

But the DY cross section too.

Inelastic-Inelastic



# Is photon induced background in LHCb measurement negligible ?

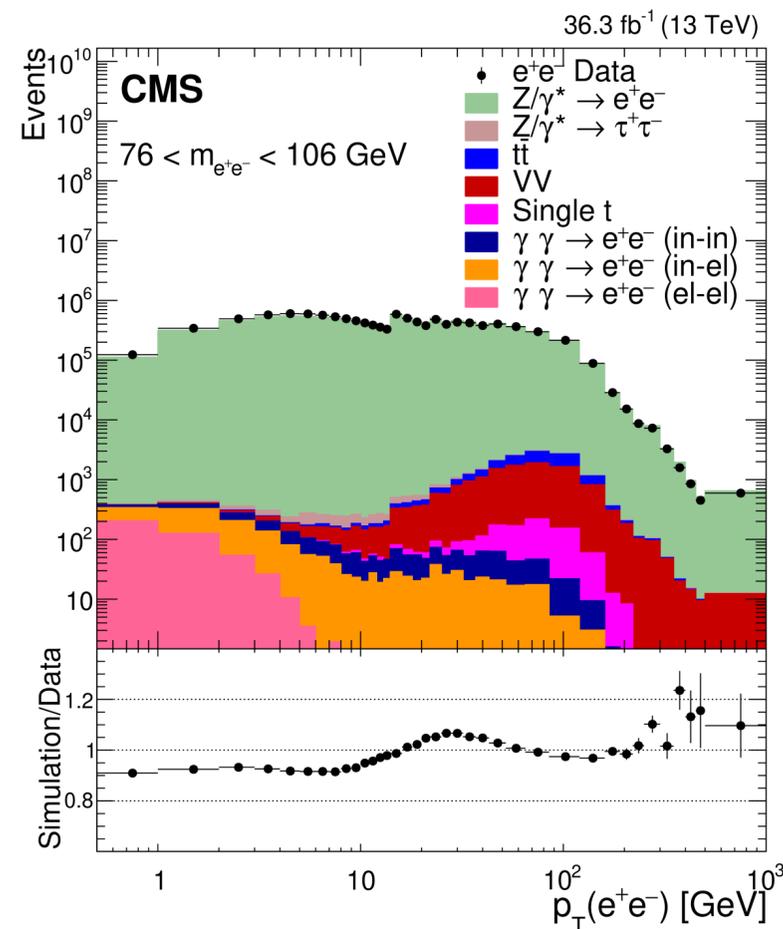
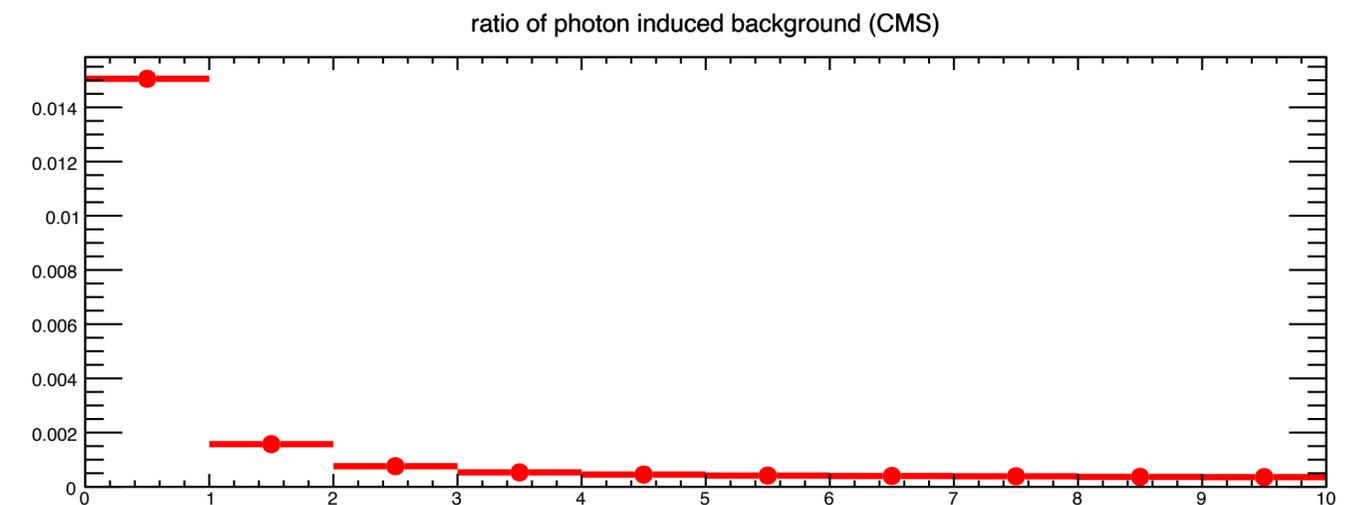
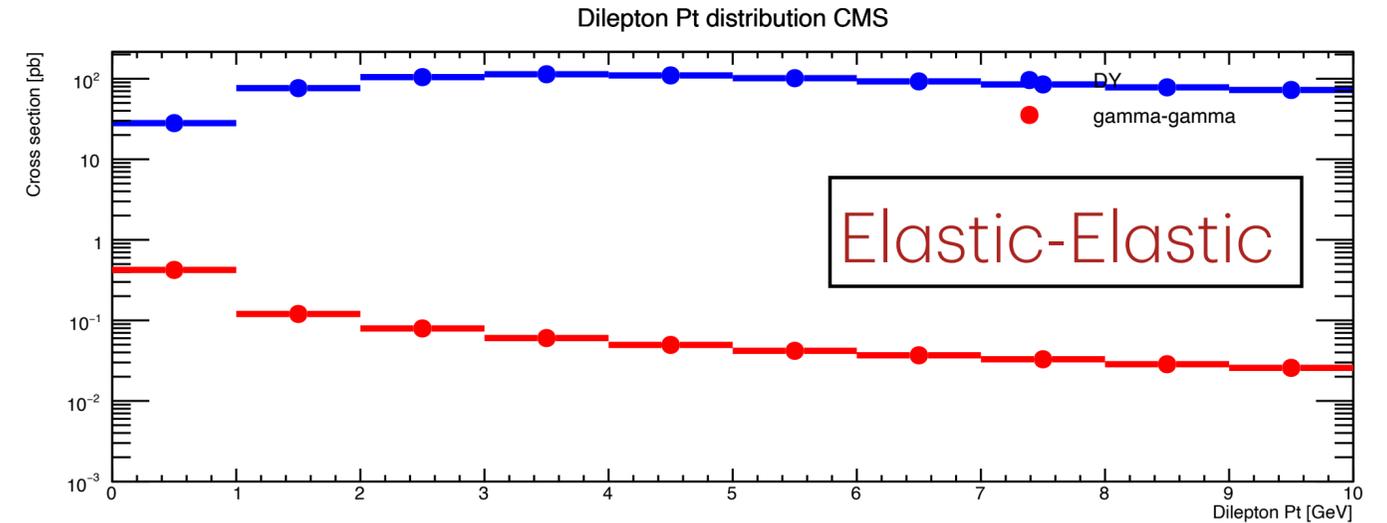
The ratio of the fiducial DY cross sections

$$\text{CMS/LHCb} \approx 10$$

The ratio of the  $\gamma\gamma$  cross sections is also  $\approx 10$

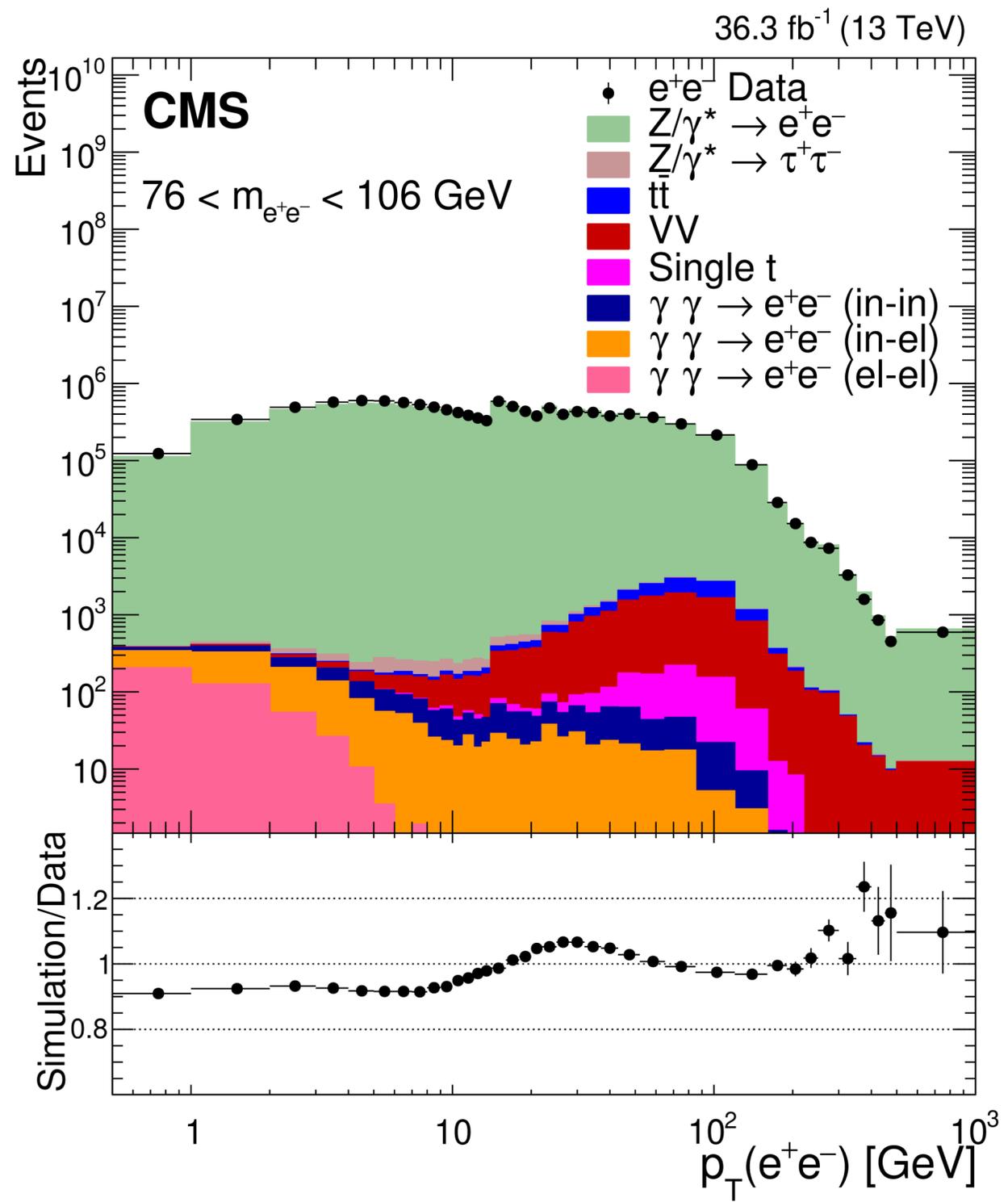
$\Rightarrow$  same relative contamination in CMS and LHCb

Elastic-elastic: 1.5% for the 1st bin [0-1] GeV

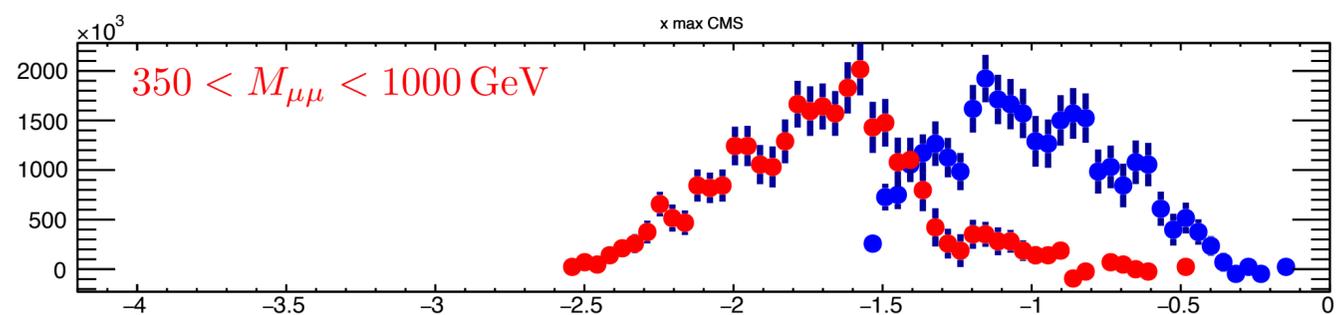
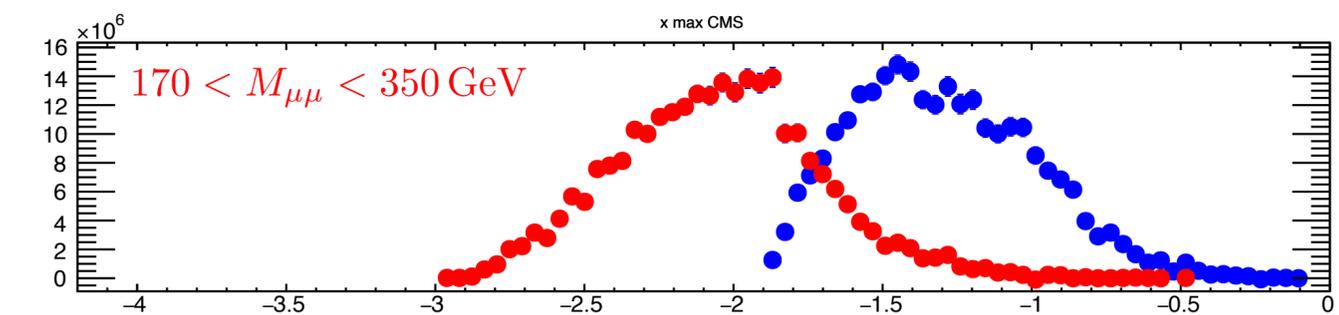
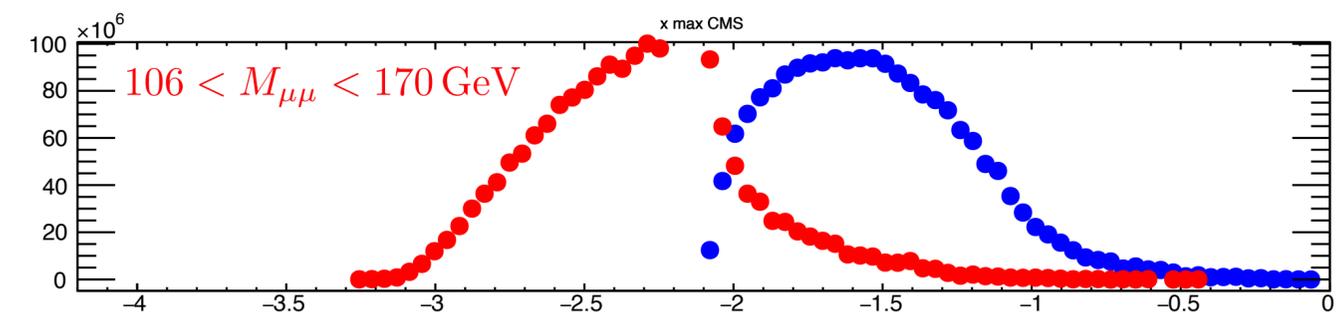
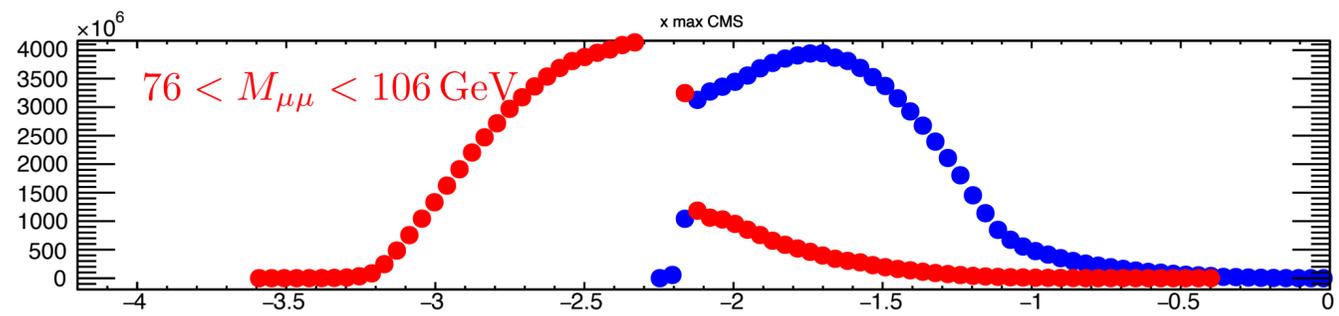
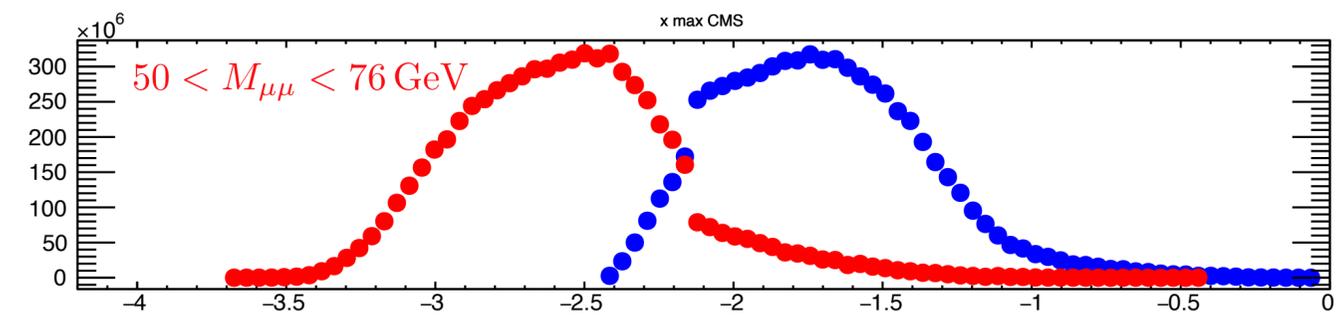


Other values ? Louis ? (From CMS-20-003)

**Back-up slides**



# x-max and x-min distributions



CMS - 13 TeV [[arXiv:2205.04897](https://arxiv.org/abs/2205.04897)]

$P_T > 20/15 \text{ GeV} \ \&\& \ |\eta_\mu| < 2.4$

5 mass bins

