We present the ratio of the cross section measurement of the $Z$/$\gamma^*$+jets production over the $\gamma$+jet production at 8 TeV. The full 2012 data collected by the CMS detector are analyzed and correspond to an integrated luminosity of 19.7 fb$^{-1}$. The measurement is performed in the kinematic region of $p_T > 100$ GeV and in the rapidity range $|y| < 1.4$. The analysis is shown with different jet multiplicities and $H_T$ requirements. We present as well the measurement of the photon cross-section in the same range and the cross section ratio between the different jet multiplicities for the photon selection. The Z part of the analysis is presented in a separate poster (Eric Takasugi).

**Introduction**

Measure the plateau:
- mass difference is negligible ($p_T^Z=m_Z$).
- $Z\rightarrow\nu\nu$: Irreducible background to searches
- $Z\rightarrow t\bar{t}$ used as a proxy for the invisible decay
- $\gamma$+jets used to extrapolate the Z spectrum to high $p_T$ or $H_T$

No k-factor applied to MadGraph.

Photon spectrum available for different selections:
- $N_{\text{jet}} \geq 1$
- $N_{\text{jet}} \geq 2$
- $H_T > 300$ GeV

**Photon**

**Cross section ratio between the $N_{\text{jet}} \geq 2$/$N_{\text{jet}} \geq 1$ and for $N_{\text{jet}} \geq 3$/$N_{\text{jet}} \geq 2$**

**Systematics**

Different systematics are taken into account and show different importance in different region of the phase space: the templates shape, the jet energy scale uncertainty, the jet energy resolution uncertainty, the pile-up model, the photon-energy scale, and the luminosity.

**Conclusions**

MadGraph (LO multi-leg MC) has a nice shape agreement, but a 20% disagreement in total rate. This description is stable, within the current precision, for different selection on the hadronic part of the event.

**References**

CMS Collaboration, "Measurement $Z$/$\gamma^*$+jets/photons+Jets cross section ratio in proton-proton collisions at $\sqrt{s}=8$ TeV", CMS-PAS-SMP-14-005