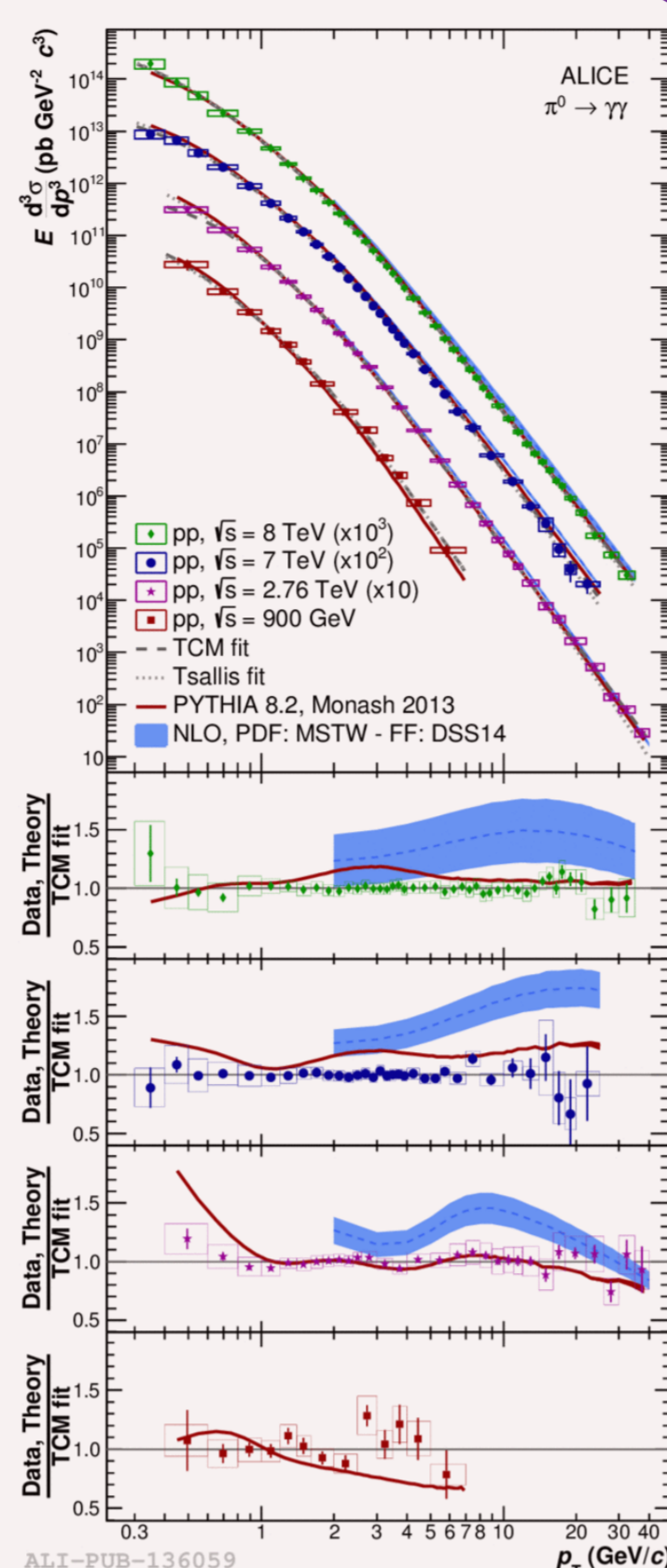
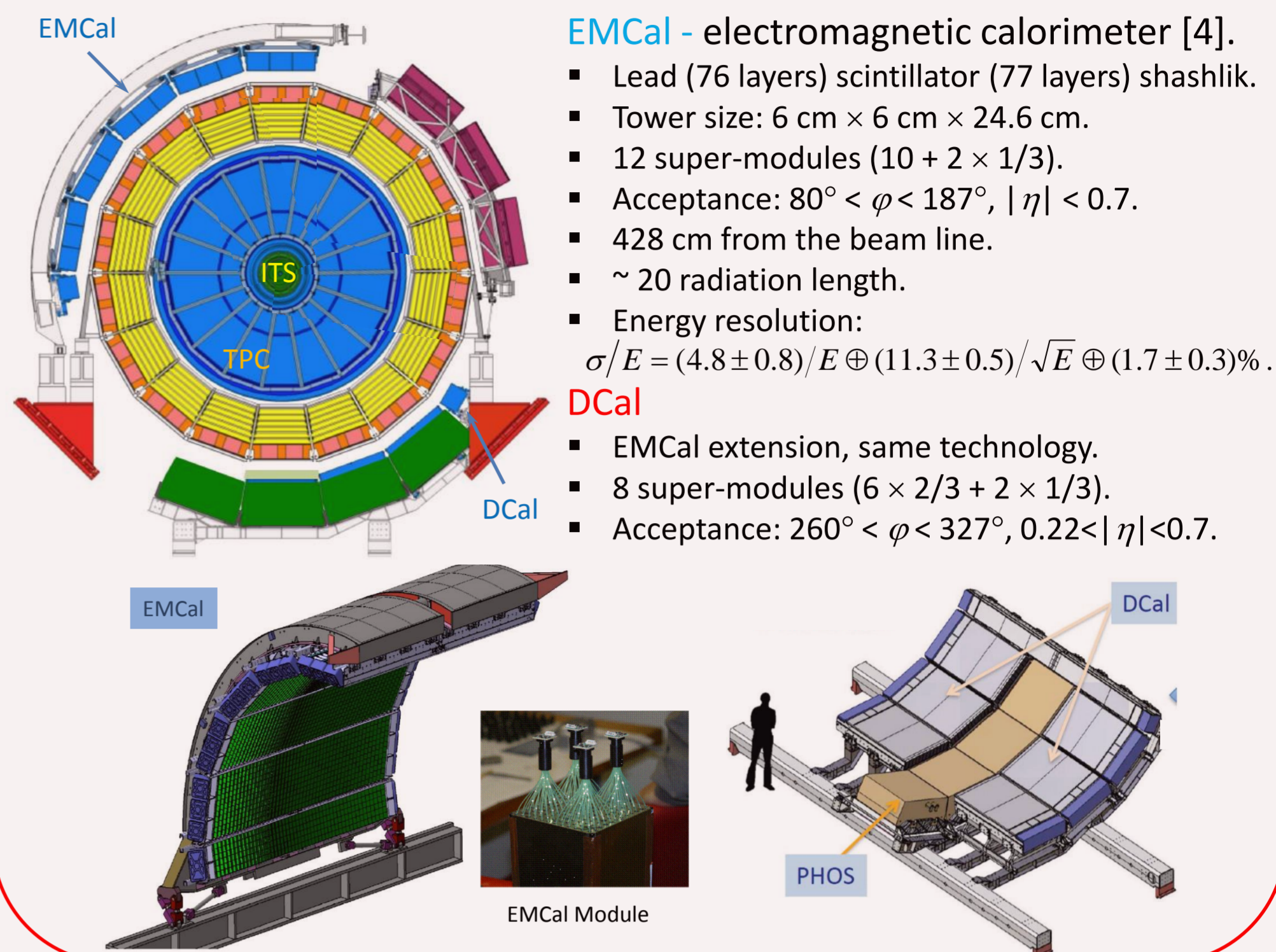


Motivation

- ALICE performs studies on neutral meson production in pp collisions at all LHC energies.
- Neutral meson production is relatively well described by pQCD in pp collisions in a limited kinematic range.
- Both π^0 and η meson spectra constrain parameters of theoretical models in both perturbative (NLO, NNLO) and non-perturbative regimes (parton distribution function, fragmentation function).
- Result at $\sqrt{s} = 5$ TeV will add a new measurement to already available spectra at $\sqrt{s} = 0.9$ [1], 2.76 [2], 7 [1] and 8 [3] TeV to study energy evolution of meson production and validate pQCD in the broad range of LHC energies.
- Result in pp collisions is important baseline for Pb-Pb and p-Pb collisions at the same per nucleon collision energy.
- Neutral mesons are sources of decay photons which are a major background for direct photon measurements.

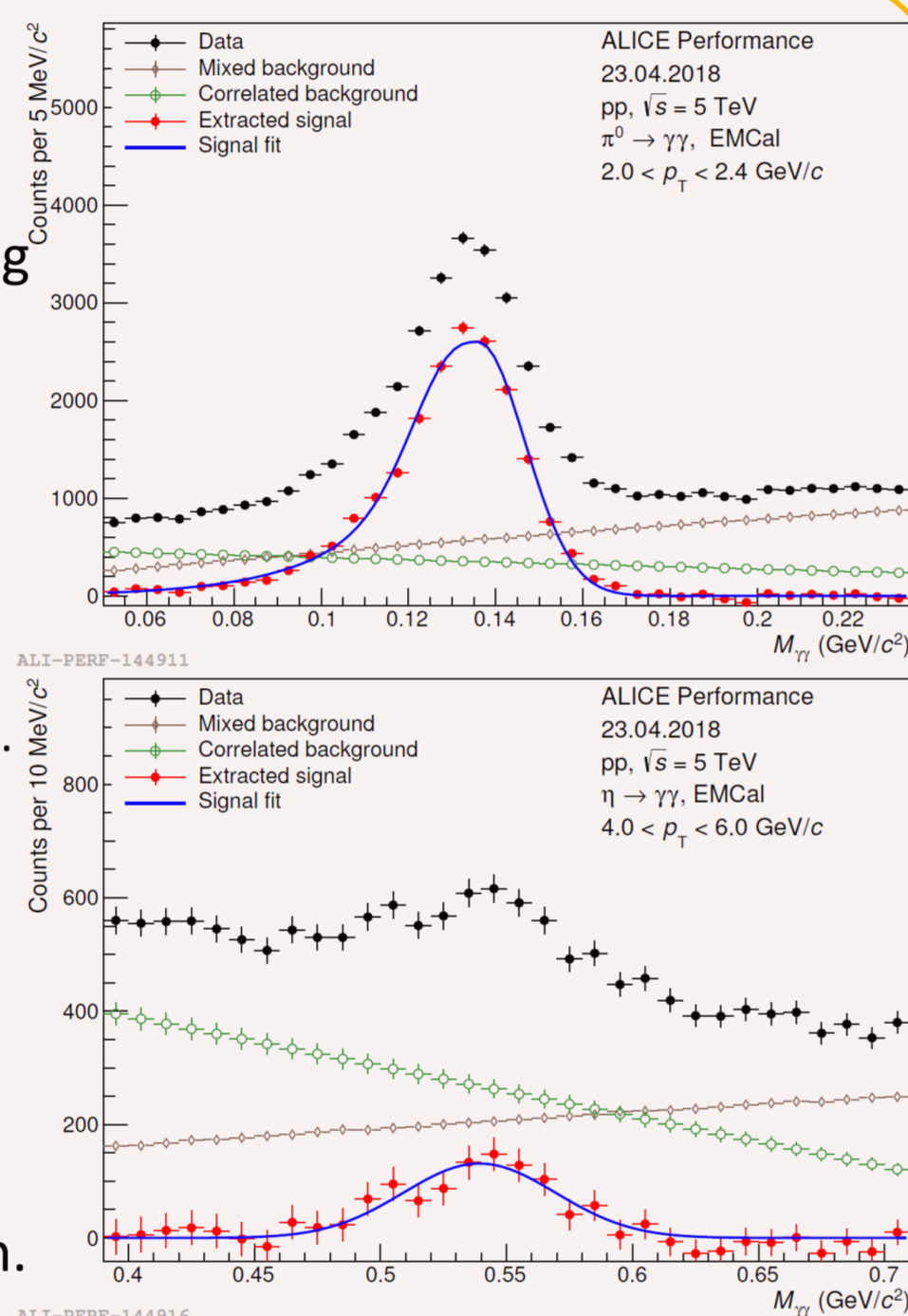


ALICE detector in LHC Run II

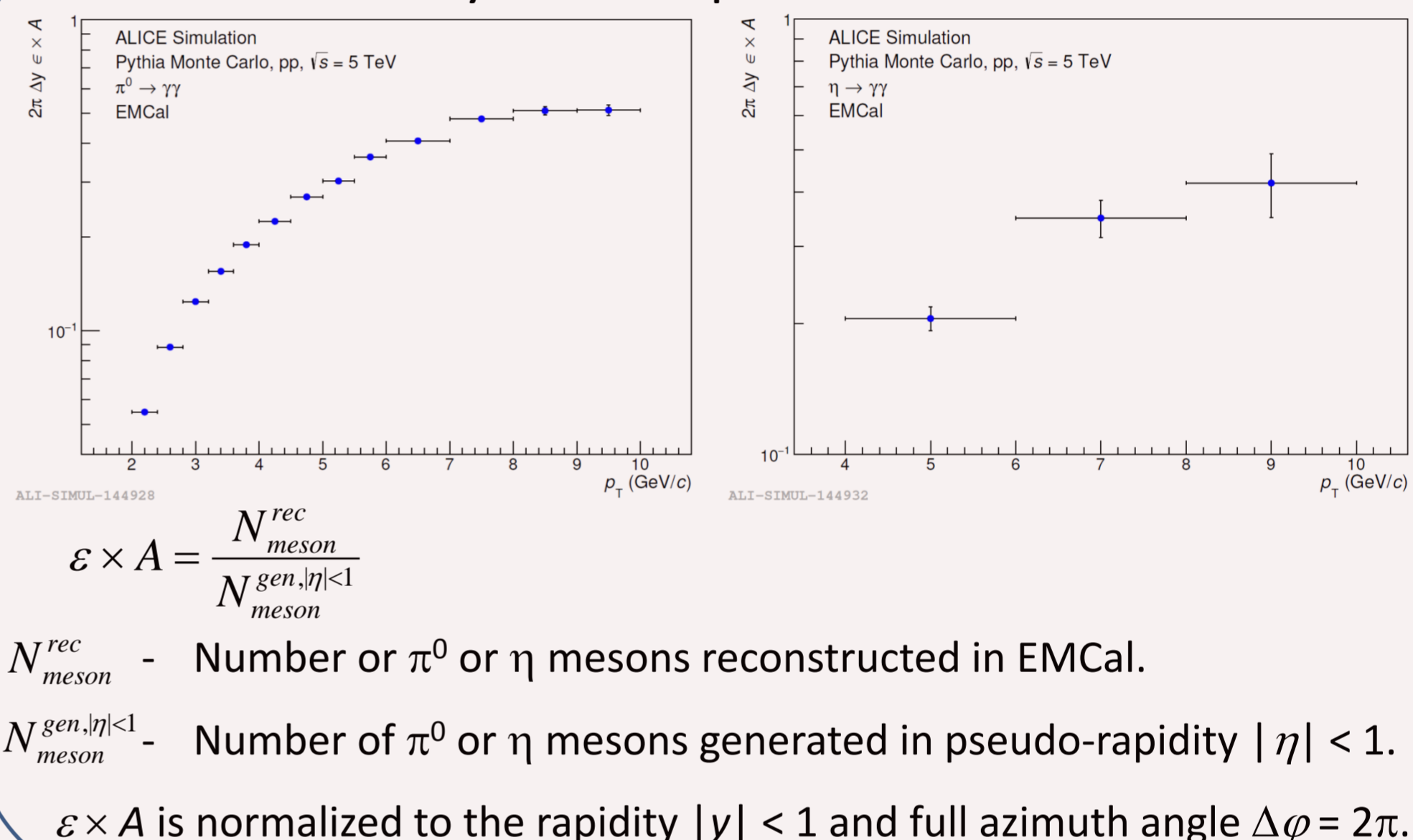


Neutral meson reconstruction

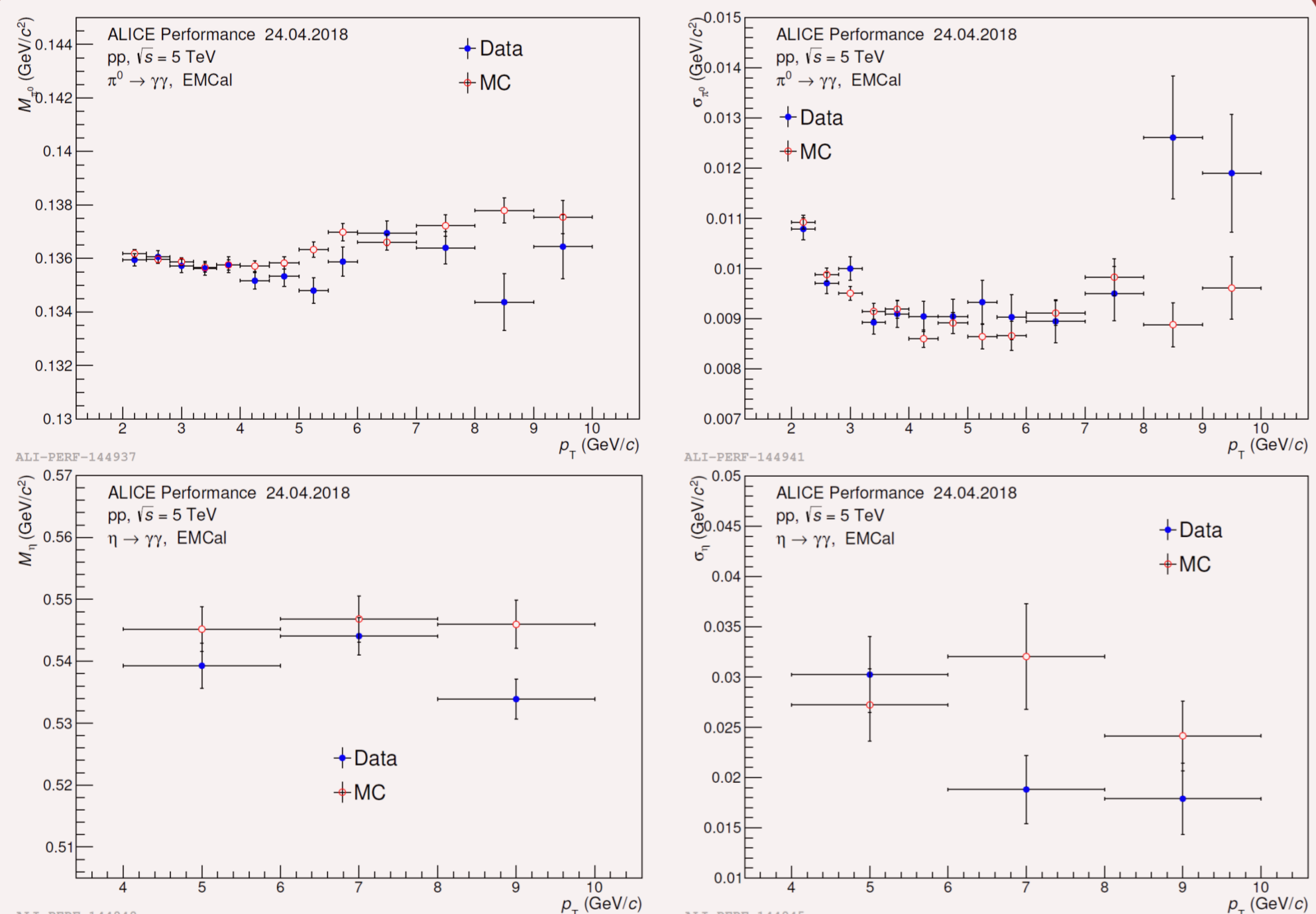
- Minimum Bias trigger (114 M events).
- Two-photon decays with a branching ratio:
 - $BR(\pi^0 \rightarrow \gamma\gamma) = 98.8\%$,
 - $BR(\eta \rightarrow \gamma\gamma) = 39.3\%$.
- Invariant mass technique:
$$M_{\gamma\gamma} = \sqrt{2E_{\gamma_1}E_{\gamma_2}(1 - \cos\theta_{\gamma_1\gamma_2})}$$
 - $E_{\gamma_1}, E_{\gamma_2}$ - photon energies. $\theta_{\gamma_1\gamma_2}$ - opening angle.
- Uncorrelated background estimated by the mixed event technique, normalized in a sideband region.
- Correlated background parametrized by a 1st order polynomial.
- Signal parametrized by a Gaussian convoluted with an exponential function.



Efficiency $\varepsilon \times$ Acceptance A correction



Data and Monte Carlo comparison



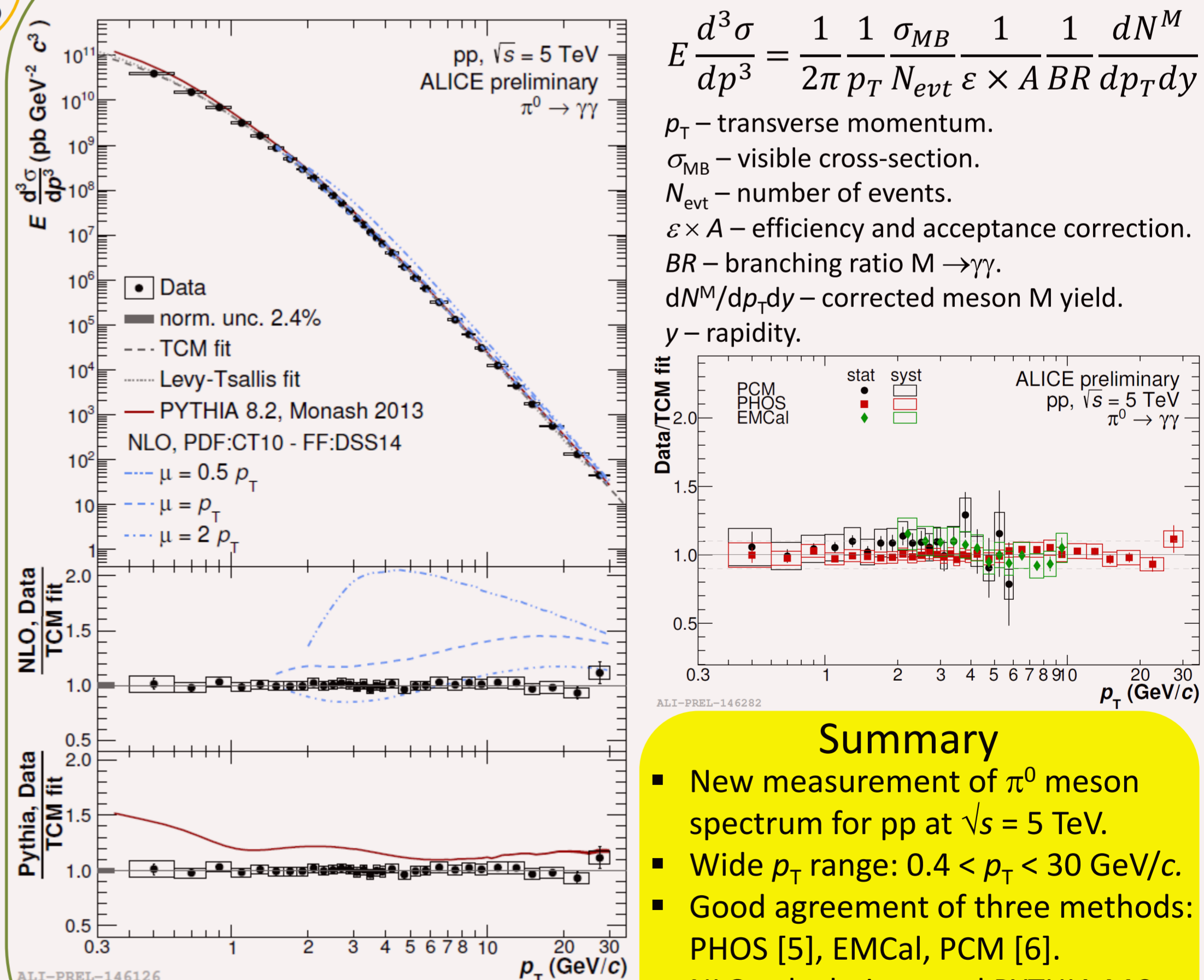
MC simulations with realistic detector response and event environment were tuned to reproduce data by adjusting calibration and non-linearity parameters. Good agreement was achieved.

EMCal measurement summary

- Good agreement between data and Monte Carlo for M and σ dependence on p_T for π^0 or η meson \Rightarrow good calibration of the detector.
- Measured transverse momentum range of π^0 meson in EMCal is $2 < p_T < 10$ GeV/c.

The poster was created thanks to the National Science Centre, Poland.

Invariant cross-section results



Summary

- New measurement of π^0 meson spectrum for pp at $\sqrt{s} = 5$ TeV.
- Wide p_T range: $0.4 < p_T < 30$ GeV/c.
- Good agreement of three methods: PHOS [5], EMCal, PCM [6].
- NLO calculations and PYTHIA MC predict higher neutral pion yield.

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- D. Sekihata presentation, 15 May 2018 at 09:00.
- H. Murakami poster n° 76.