

Photons in early data at Belle II

FH fellow meeting

Nataliia Kovalchuk
Hamburg, 01.02.2019

About Me

Background

- I am Ukrainian, grew up and studied in Kyiv
- My scientific career started as a DESY summer student
- Academic degrees:
 - **BSc and MSc** in 2014
National University of “Kyiv-Mohyla Academy”
doing **ZEUS experiment**
- **PhD** in March 2018
University of Hamburg
doing **CMS experiment**
- Current position:
DESY fellow since May 2018
doing **Belle II experiment**



Past research

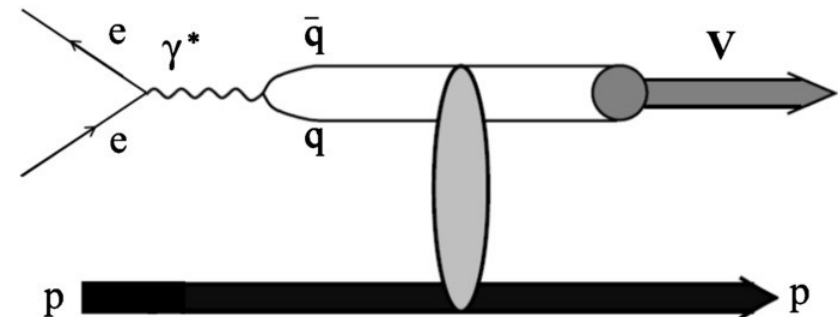
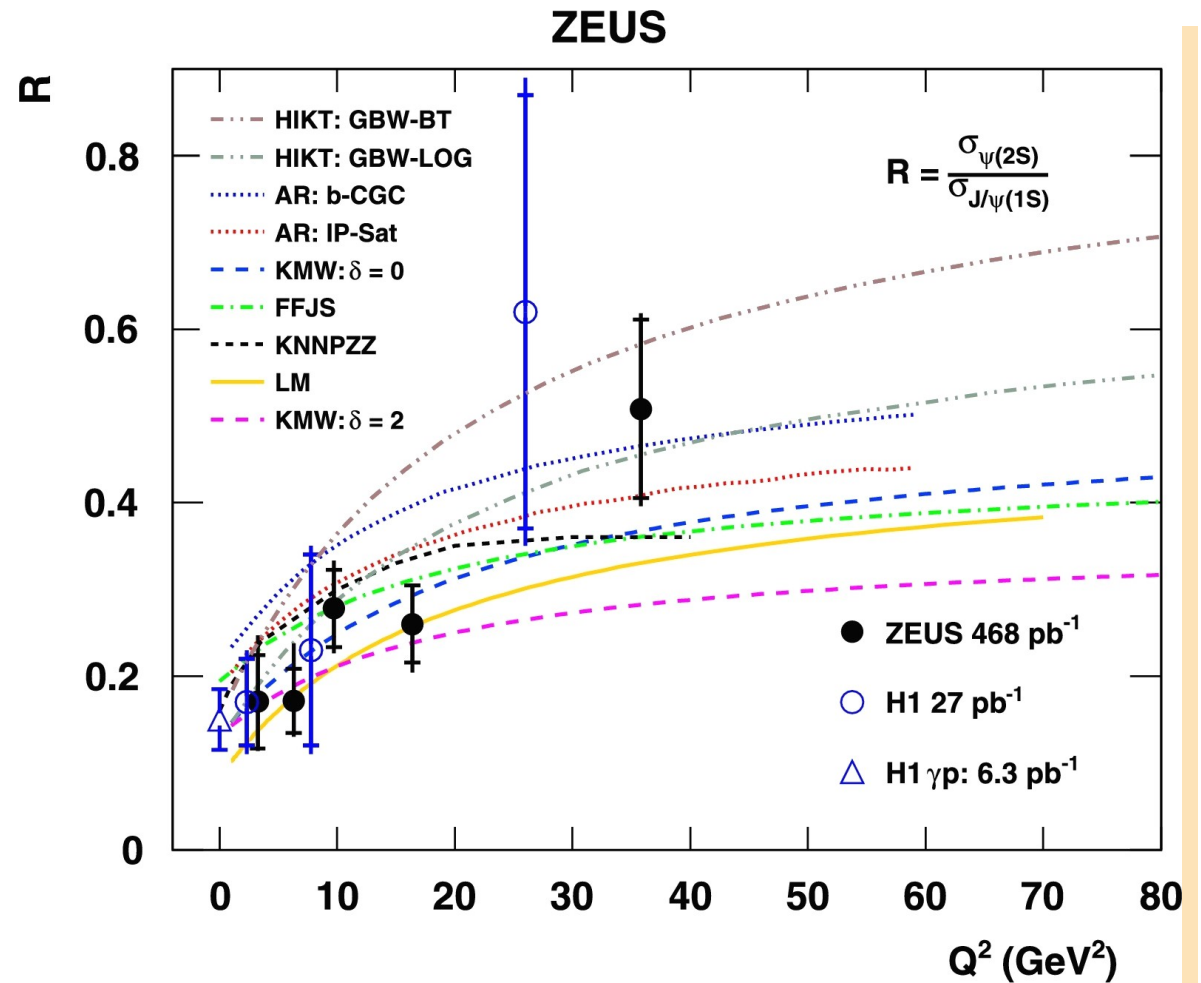
ZEUS experiment

- For my BSc and Msc I was analysing HERA I and HERA II data



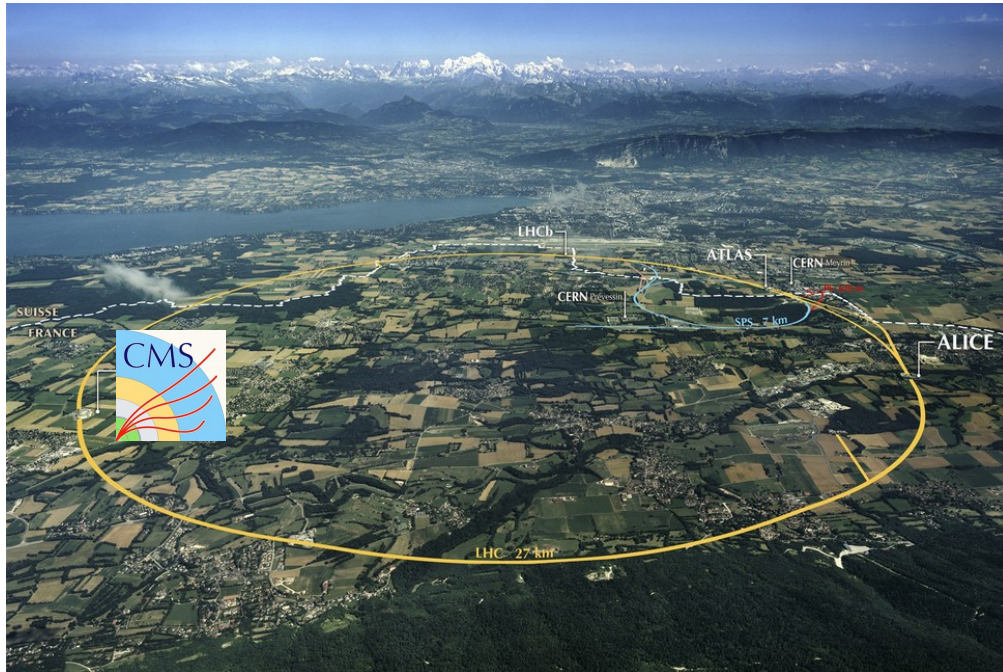
- “Measurement of the cross-section ratio $\sigma_{\psi(2S)} / \sigma_{J/\psi(1S)}$ in deep inelastic exclusive ep scattering at HERA”

Nucl.Phys. B909 (2016) 934-953

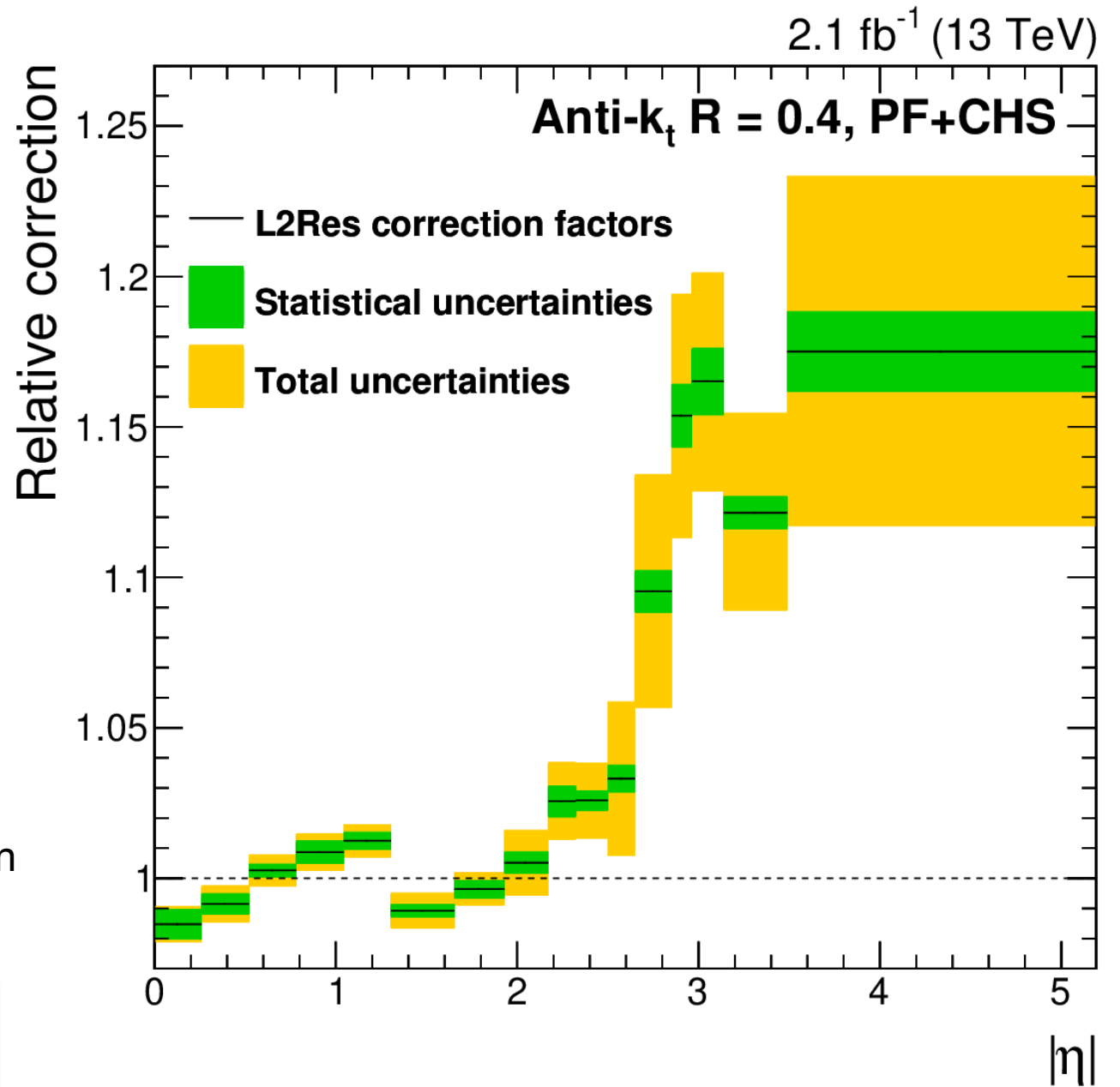
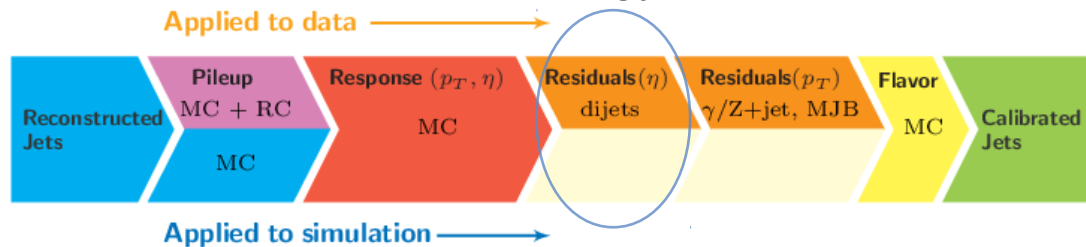


Past research

CMS experiment



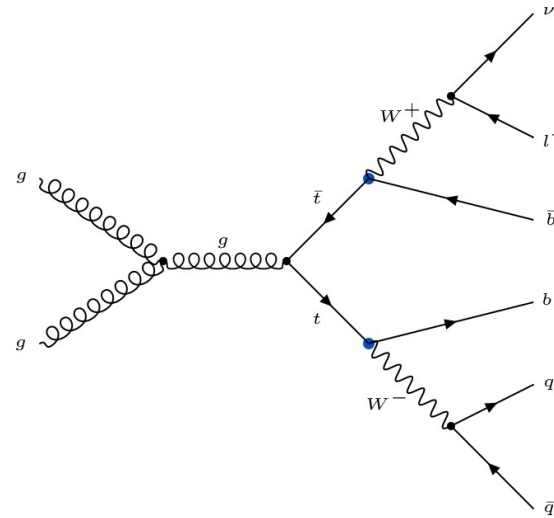
- During my PhD I was one of the responsible person to derive a residual Jet Energy Correction



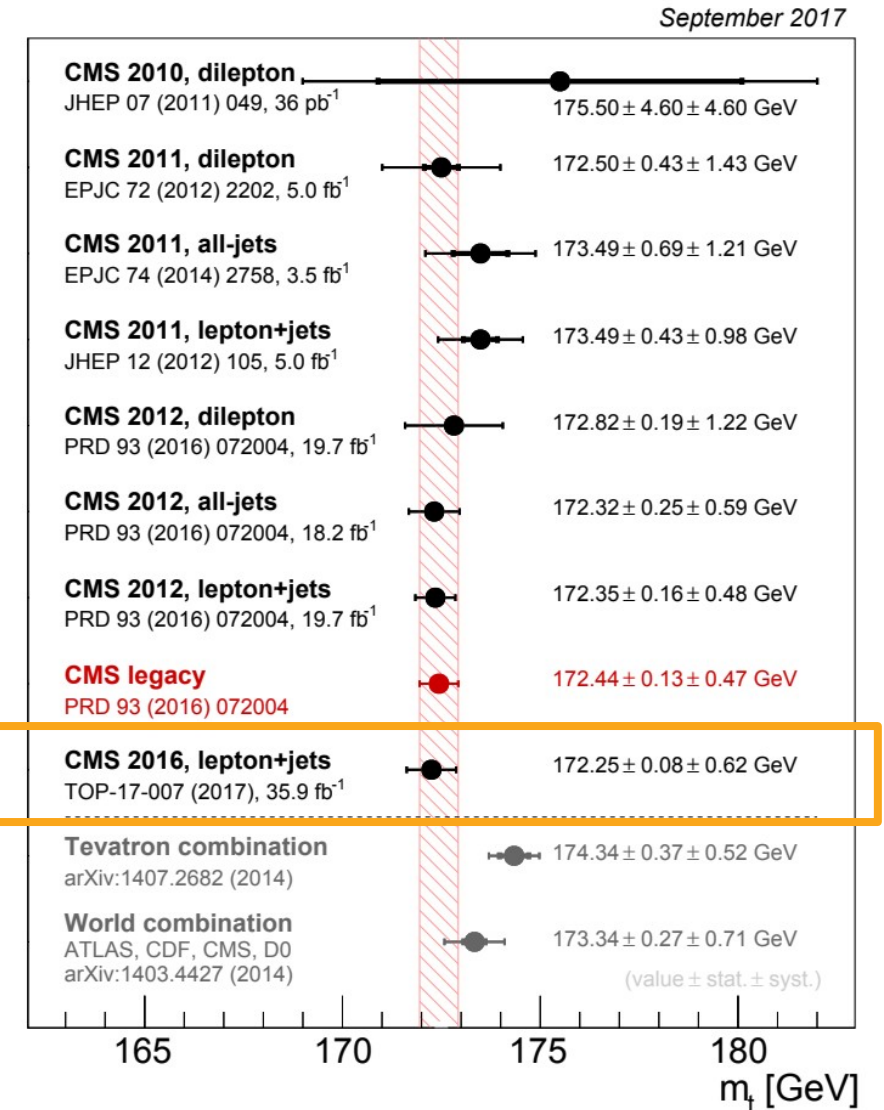
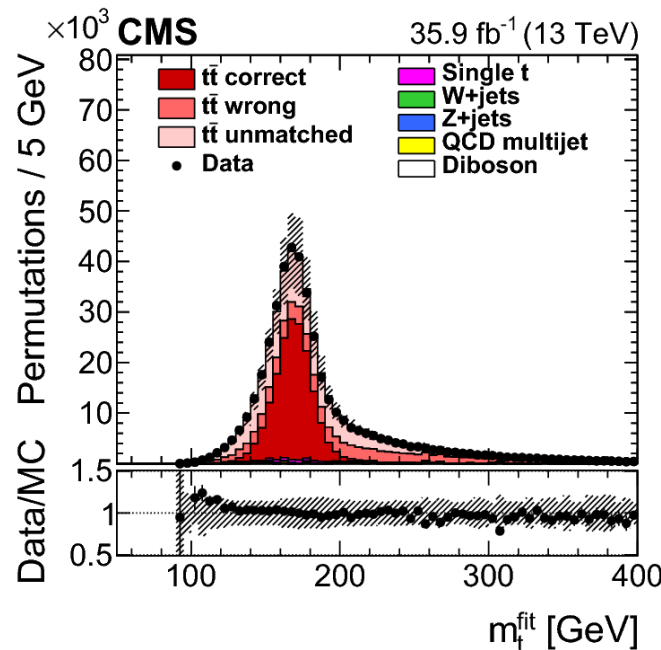
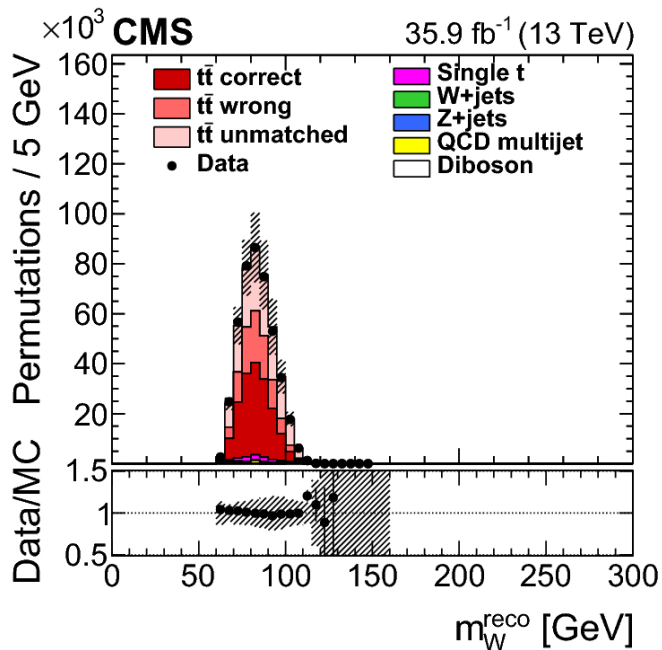
Past research

CMS experiment

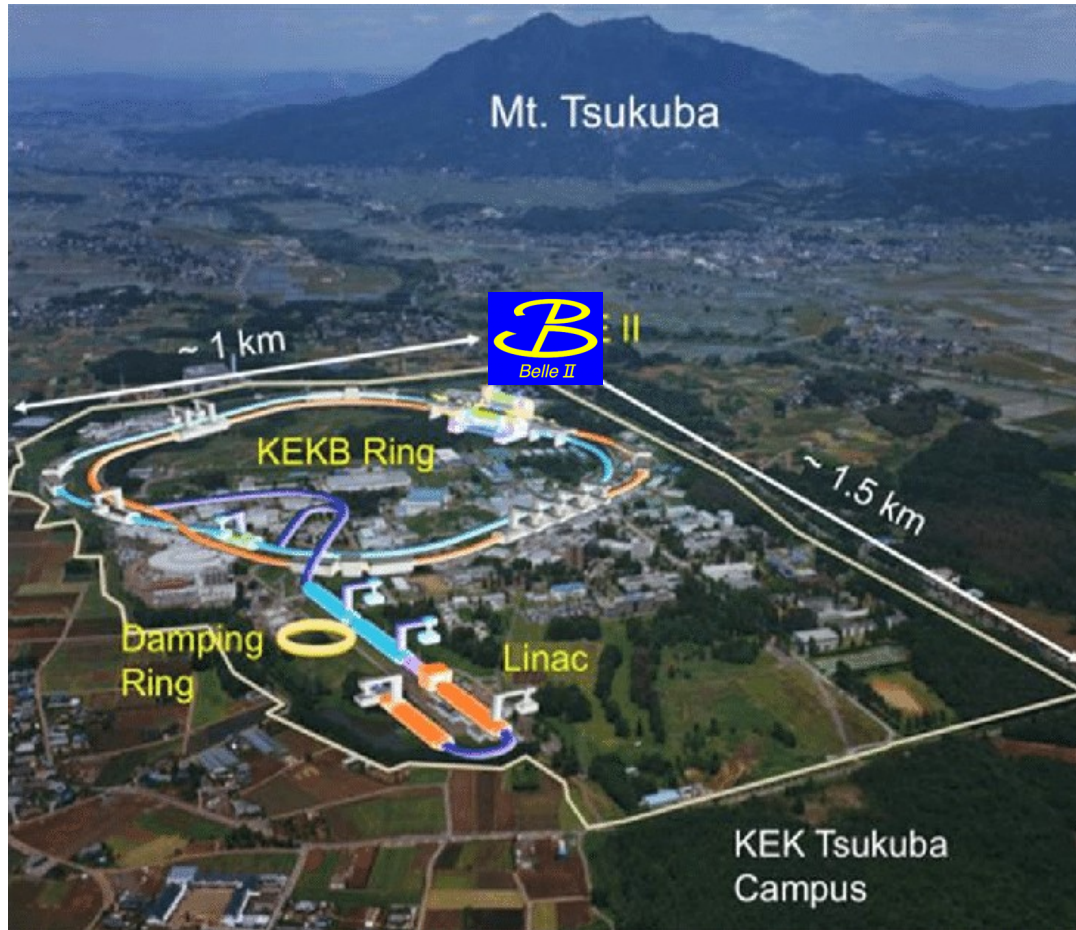
- The main analysis during my PhD was: “Measurement of the top quark mass with lepton+jets final states using pp collisions at $\sqrt{s}=13\text{TeV}$ ”



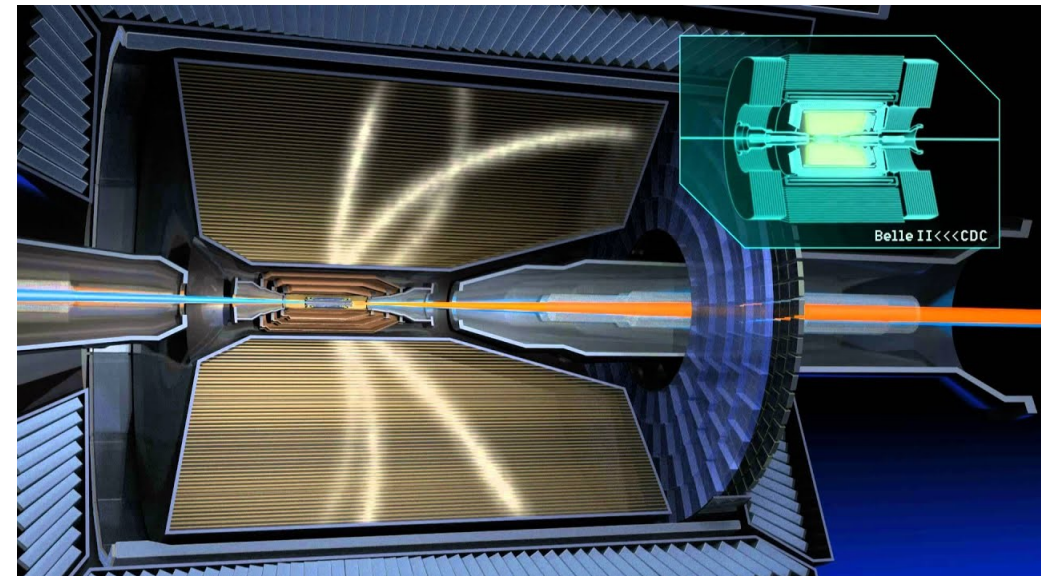
Eur. Phys. J. C78(2018) 891



Belle II experiment



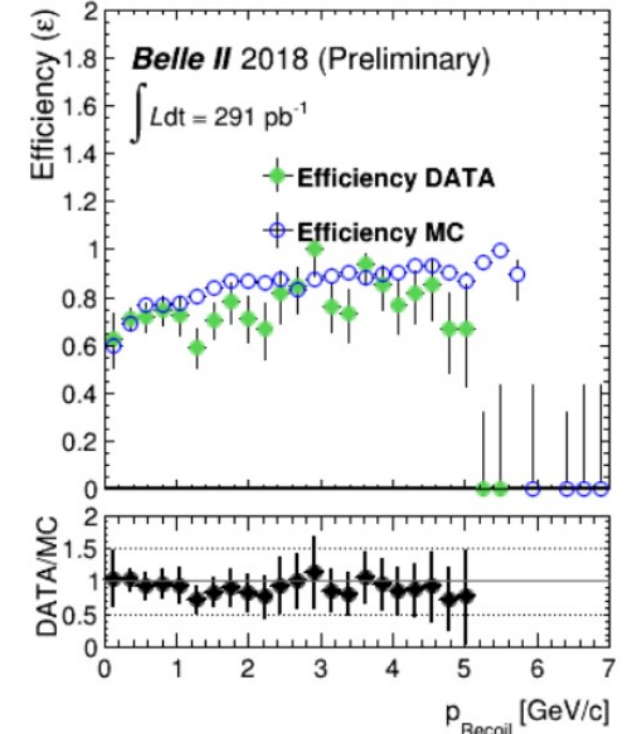
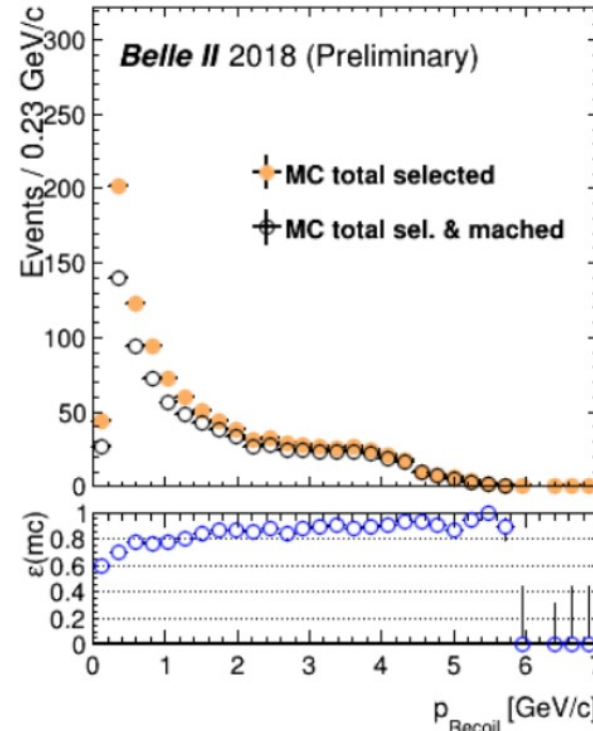
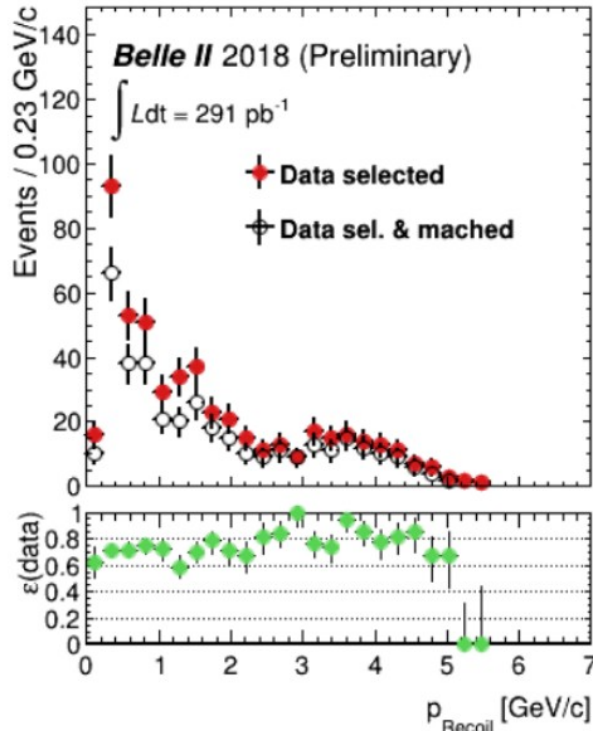
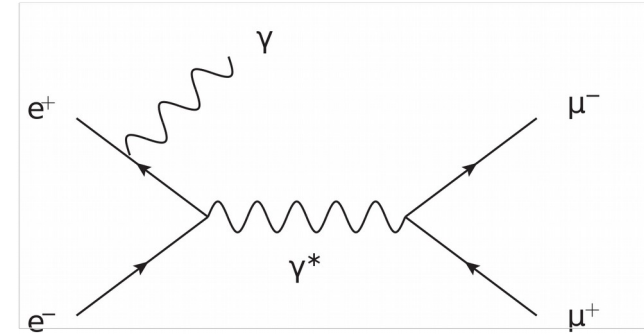
- Much cleaner environment compared to LHC
- First collision data in 2018
- Expect 50 ab^{-1} of data during the next years
- New facility to provide precision tests of SM, as well as complimentary program of Dark Matter searches



Photons in early data at Belle II

γ reconstruction in radiative $ee \rightarrow \mu\mu\gamma_{ISR}$ events

- One of the most precise method to study γ reconstruction efficiency
- Select radiative muon pair without looking at γ
- Predict kinematics of γ as missing recoil momentum



$$\text{Efficiency} = N(\text{sel. \& matched } \gamma \text{ events}) / N(\text{sel. \& no matched } \gamma \text{ events})$$

My Favourite Pictures

