

First results from Belle II commissioning run
Jakub Kandra on behalf of Belle II collaboration





Performance @ Belle II



I) Vertexing:

- Time measurement
- Detector:
 - Pixel detector
 - Strip detector

II) Tracking:

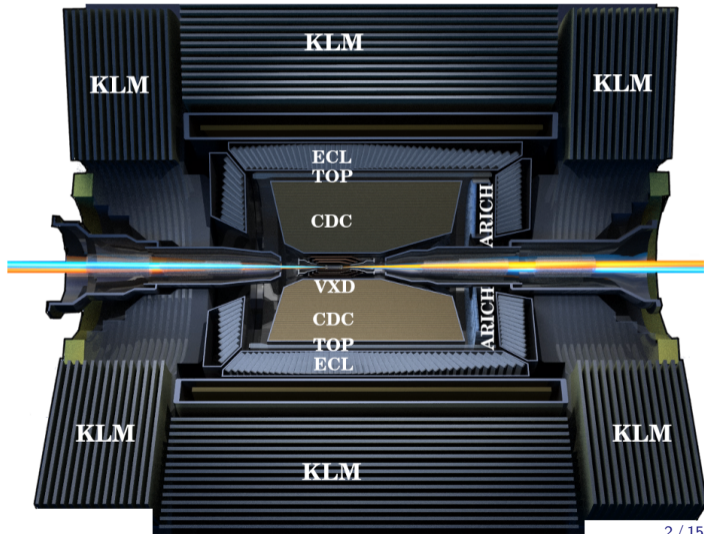
- Mass measurement
- Detector:
 - Pixel detector
 - Strip detector
 - Central drift chamber

III) Particle identification:

- Flavour tagging
- Detector:
 - Energy loss @ CDC
 - Cherenkov radiation @ ARICH, TOP
 - KLong-muon system

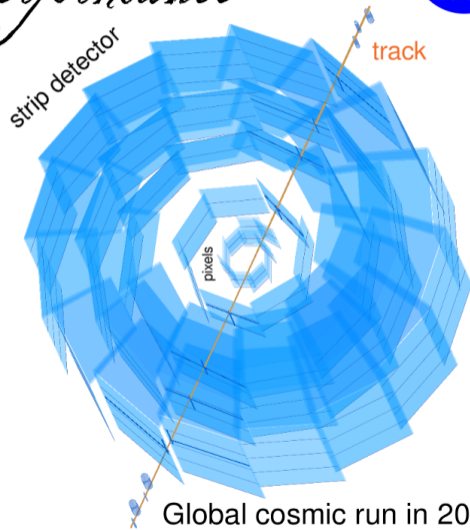
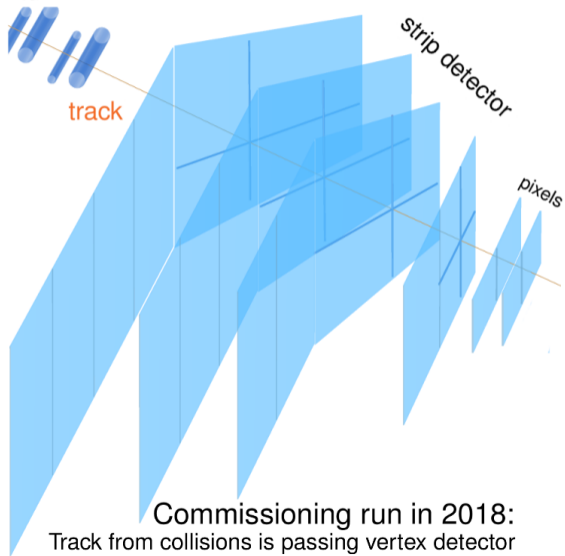
IV) Neutrals reconstruction:

- Semileptonic decays
- Rare decays
- Dark matter
- Detector:
 - Electromagnetic calorimeter
 - KLong-muon system





Vertex detector performance

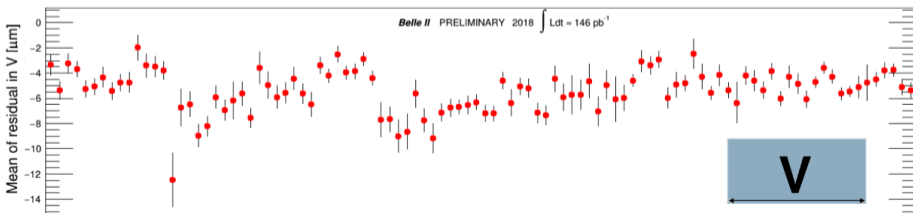
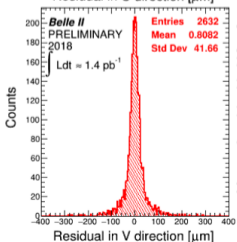
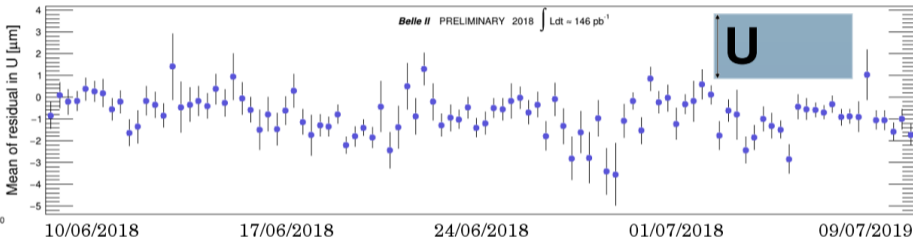
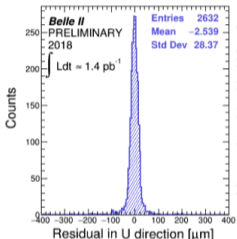




Vertex detector performance



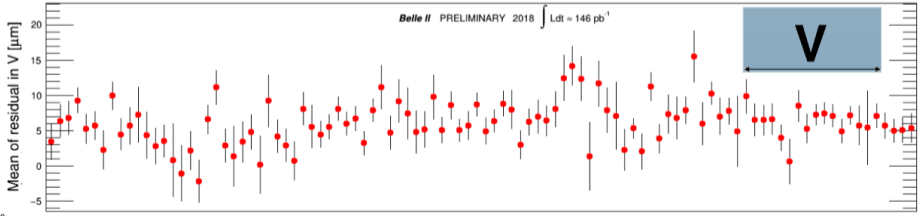
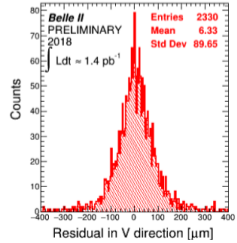
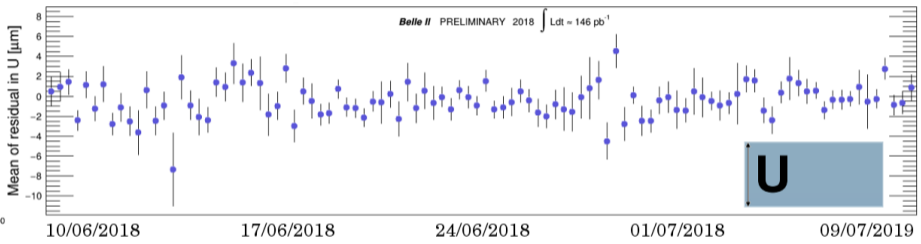
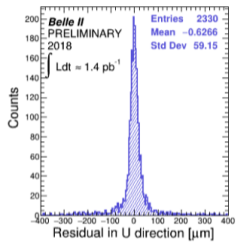
Precision and stability of pixel detector





Vertex detector performance

Precision and stability of strip detector

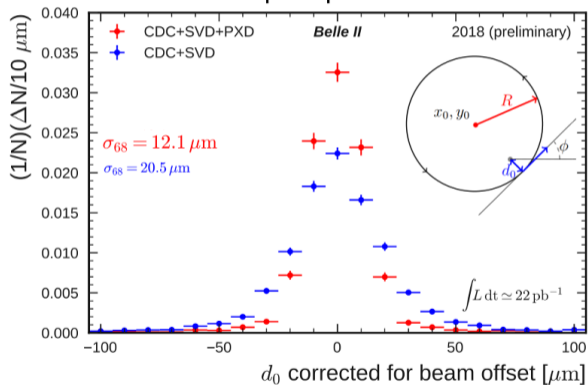




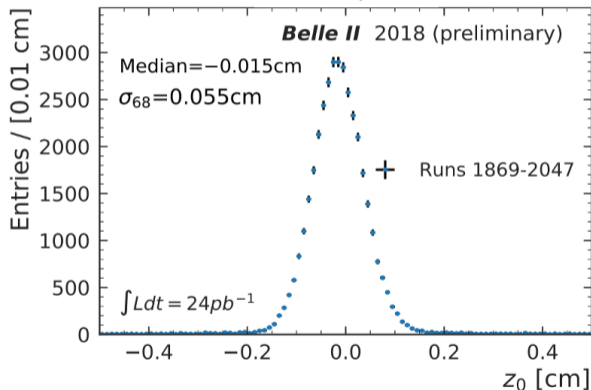
Vertex detector performance



Transverse impact parameter resolution



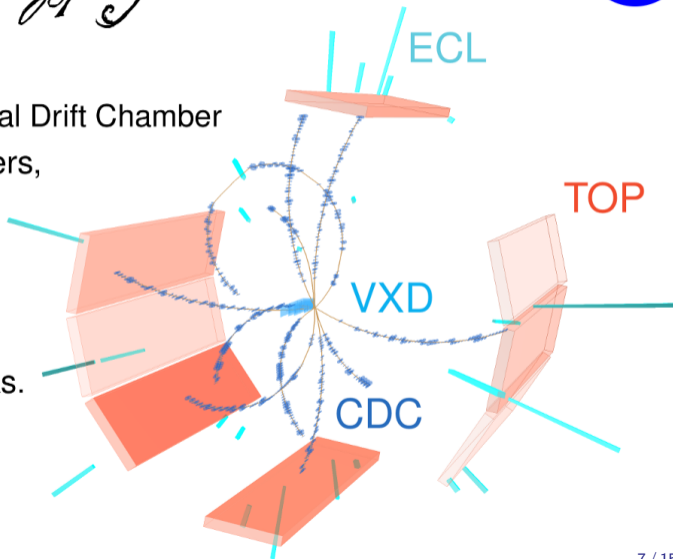
Vertex spread



- The SuperKEKB on the road to Nano-Beam Scheme: Narrow interaction point comes from strong focusing and large crossing angle.

Tracking performance

- Main tracking detector is the Central Drift Chamber
- It connects VXD with TOP counters, ECL clusters and KLM sectors.
- Tracks from the CDC were available since first collisions.
- Detector was aligned within few weeks mainly using cosmic tracks.
- Magnetic field is measured to high accuracy.



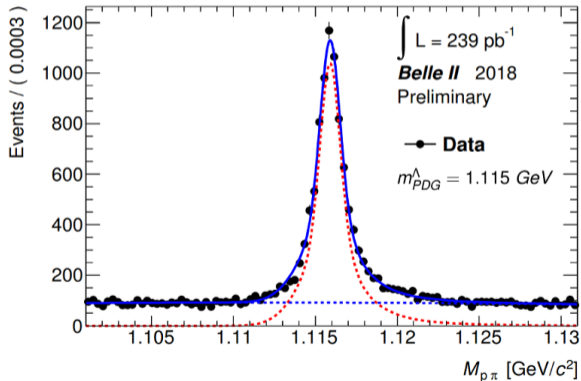
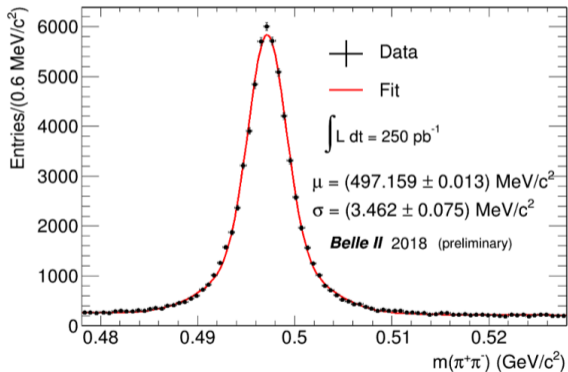


Tracking performance



$$K_S \rightarrow \pi^+ \pi^-$$

$$\Lambda \rightarrow p \pi^-$$



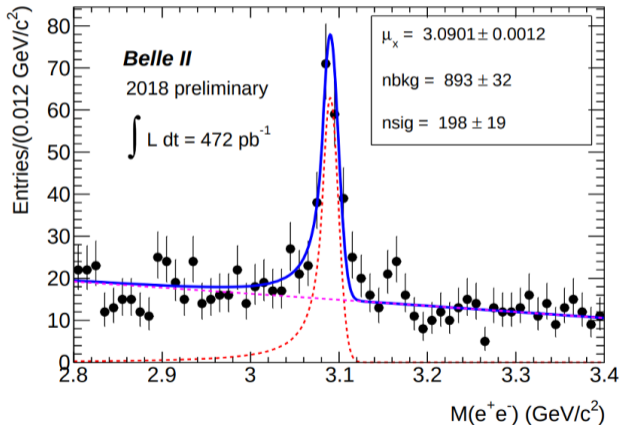
- Mass resolution is in good agreement with Monte Carlo predictions, on par with Belle.



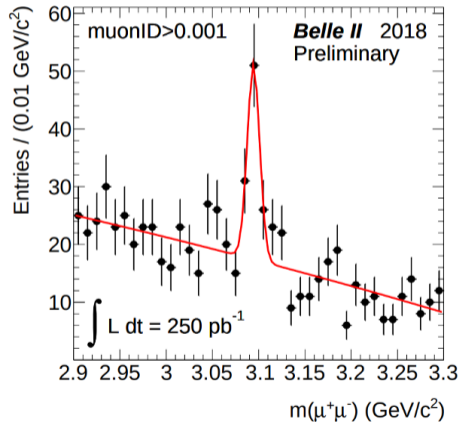
Tracking performance



$$J/\psi \rightarrow e^+e^-$$

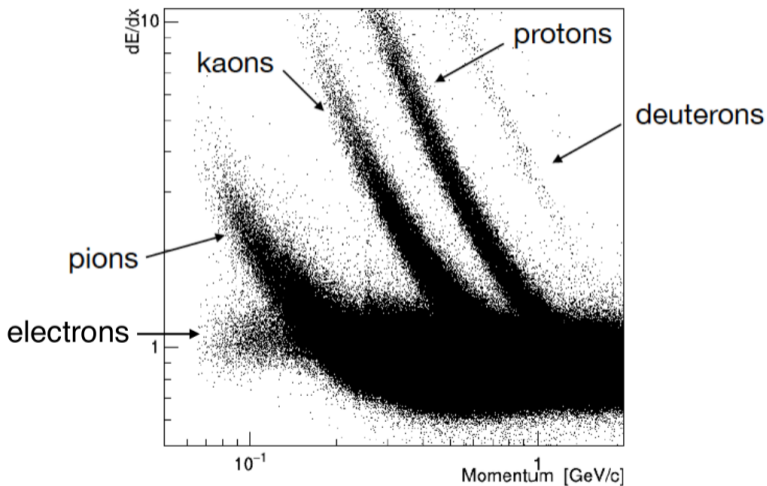


$$J/\psi \rightarrow \mu^+\mu^-$$



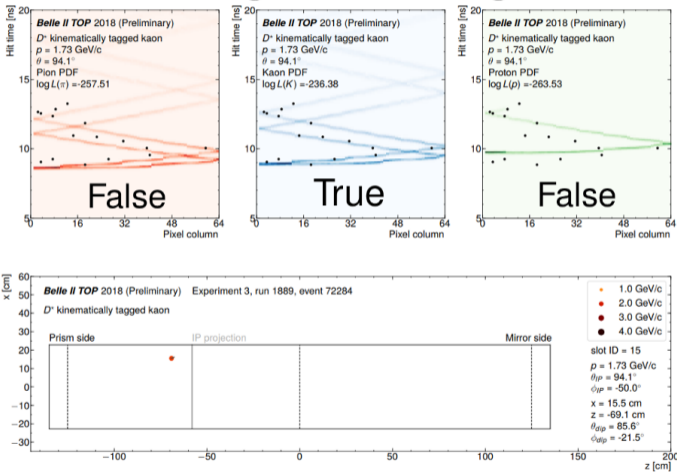
- Mass resolution is in good agreement with Monte Carlo predictions, on par with Belle.

Particle identification performance



- Energy loss in Central Drift Chamber using hadronic event sample.

Particle identification performance



- Visualisation of the Cherenkov rings in the time-of-propagation counter

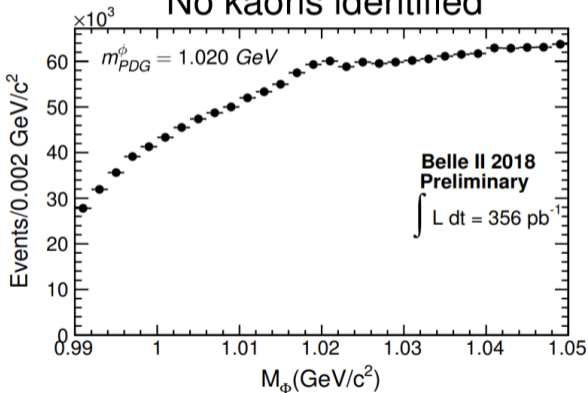


Particle identification performance

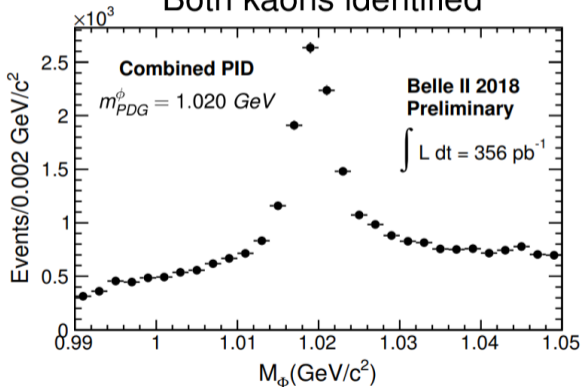


$$\phi \rightarrow K^+ K^-$$

No kaons identified



Both kaons identified



- An example of Kaon identification capabilities using combined information

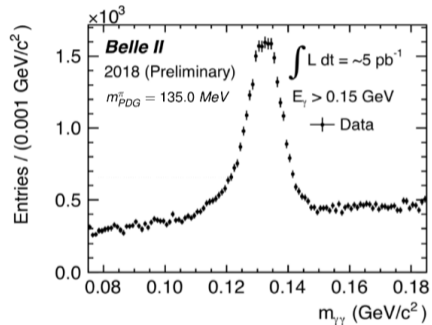
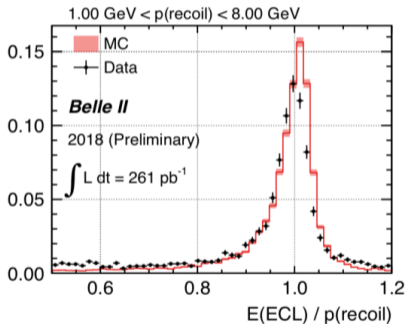
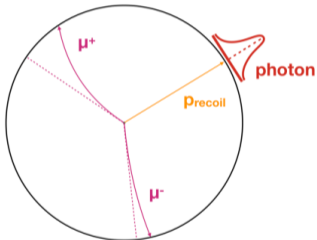


Neutrals reconstruction performance



$$e^+e^- \rightarrow \mu^+\mu^-\gamma$$

$$\pi^0 \rightarrow \gamma\gamma$$



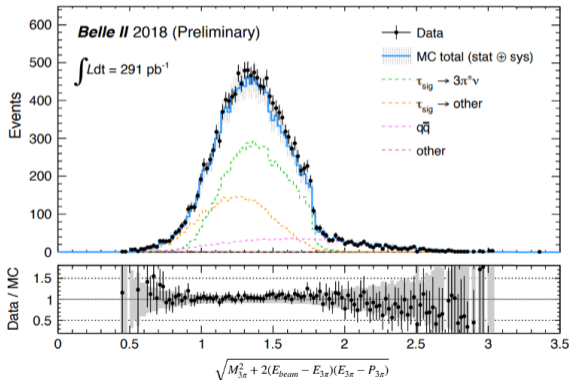
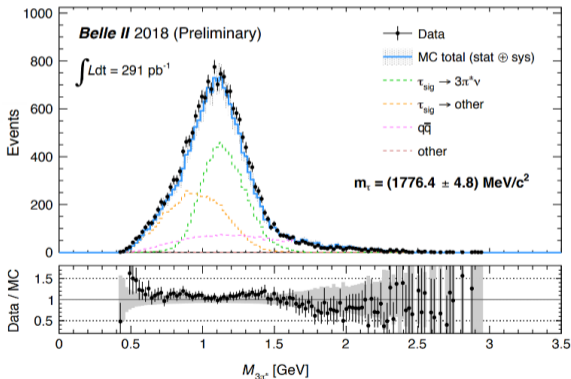
- Good reconstruction of a single photon and a pair of photons.



First physics results



Lepton physics: τ lepton



- Results are in good agreement with Monte Carlo predictions, on par with other experiments.



Summary



THE

NEW GENERATION

of



is



The NEW PHYSICS

talk



“thank you for
your **ATTENTION**
:)”

- **Daniel Cuesta:** "SuperKEKB and Belle II status and plans"
- **Eldar Ganiev:** "B physics re-discoveries with Belle II"



Back up



Belle II commissioning run means **Phase 2** in Belle II jargon. There was used full Belle II external detector with internal background detector (VXD samples shown in slide 4). Collisions were provided with full superconducting final focusing.

