Toward a study of Λ(1405) via the d(K- ,Σπ) reaction

2018/03/24

Osaka University, RCNP
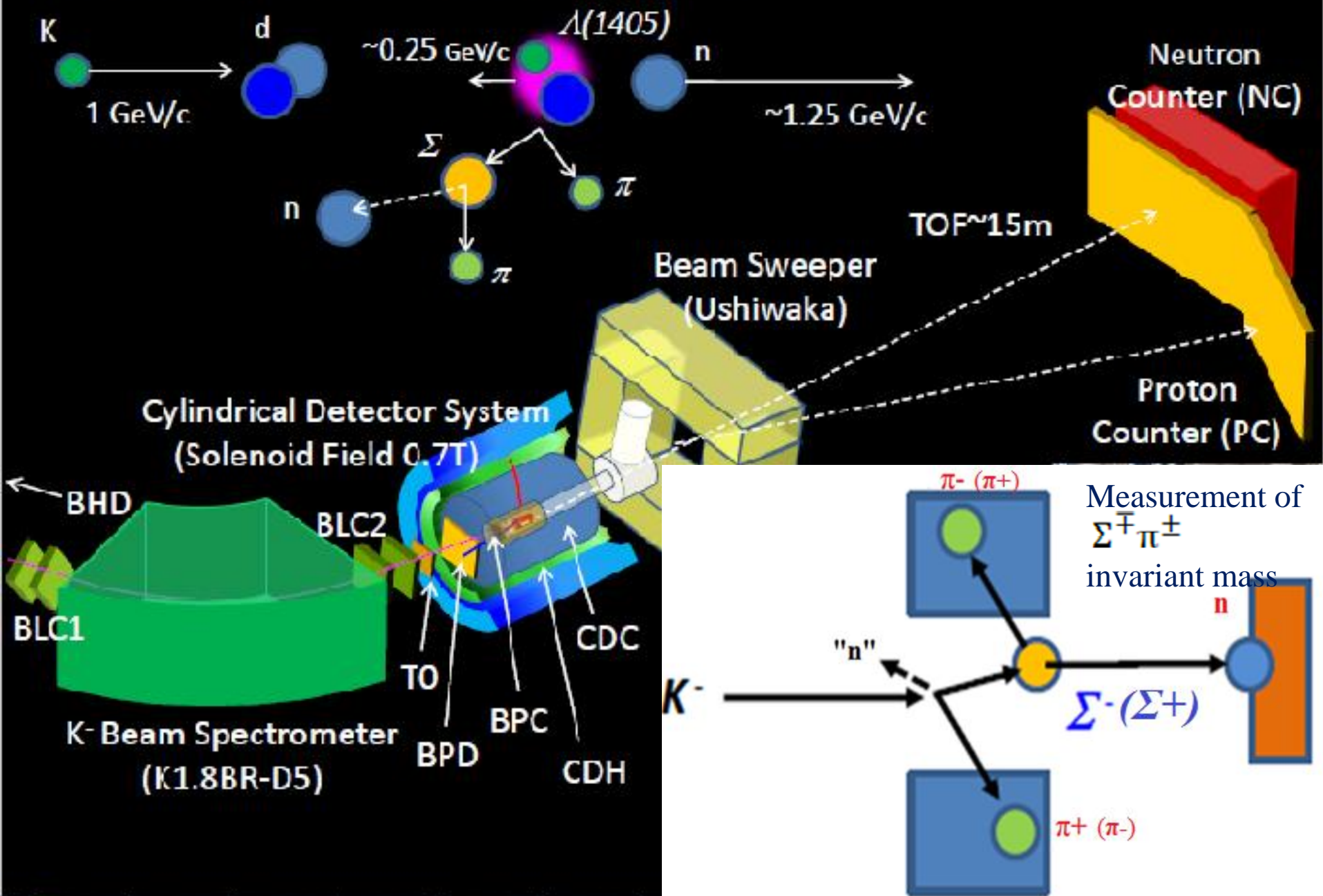
Omar Zhadyra for the J-PARC E-31 collaboration

The main goal:

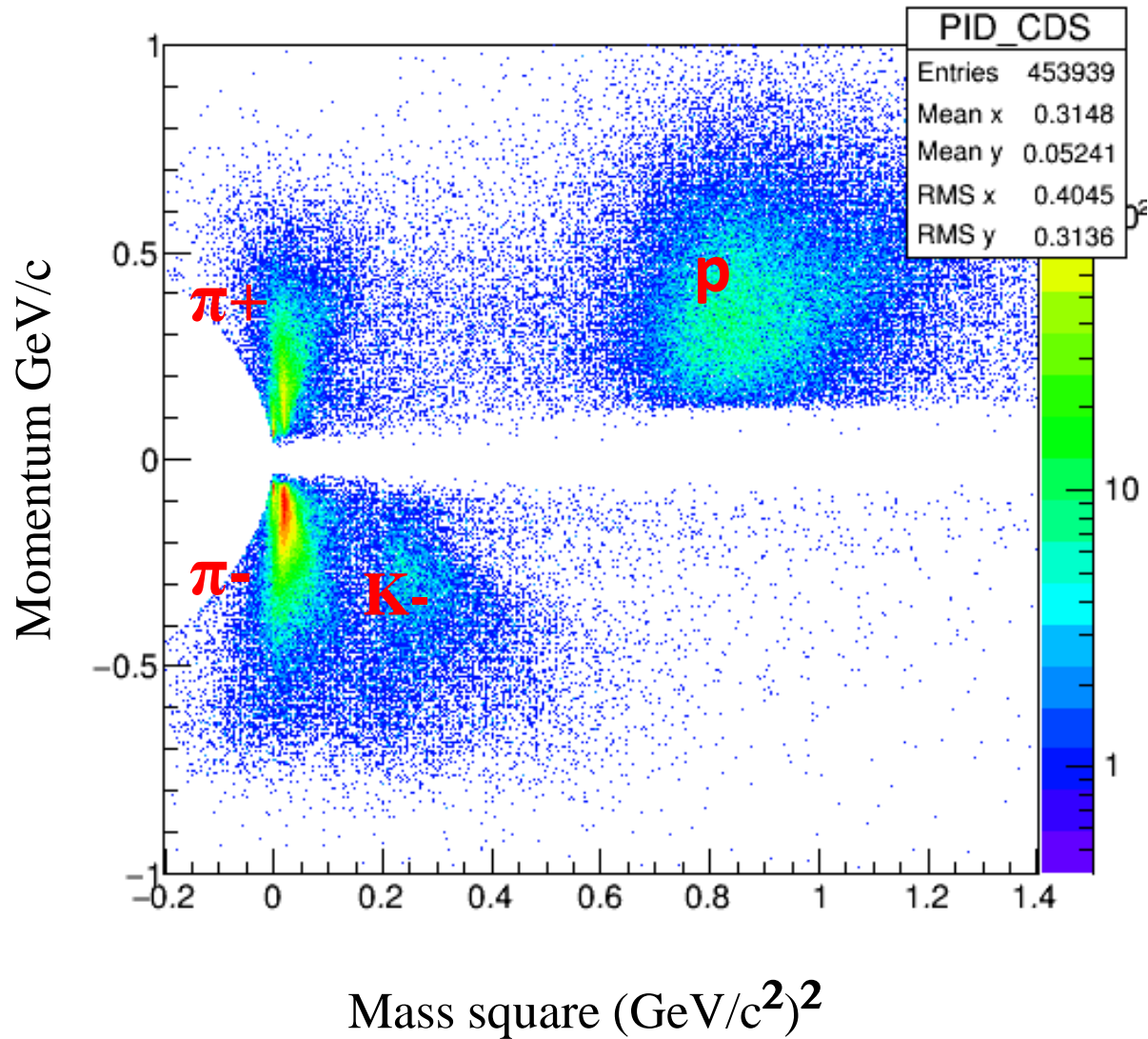➢ To measure the invariant Mass of the $\Sigma^{\mp}\pi^{\pm}$ in the $\mathbf{d(K^-, \Sigma\pi)"n"}$ reaction.

!!! Presented based on approximately 10% of the E31 data!!!
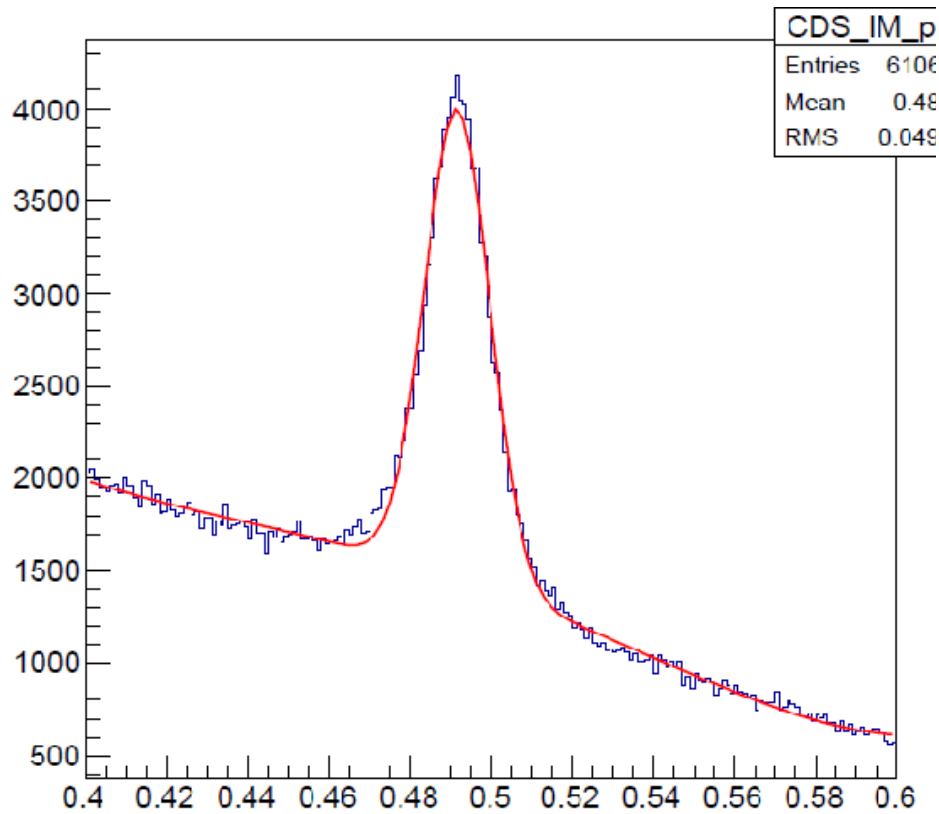
Experimental Setup for E31

Measurement of $\Sigma^{\mp}\pi^{\pm}$ invariant mass

Momentum and mass distribution measured by the CDS (PID).

Caption: Mass square (GeV/c^2)^2

K°bar mass reconstruction

Forward neutron

CDS

NC

Invariant Mass of $\pi^+\pi^-$ (GeV/ c^2)
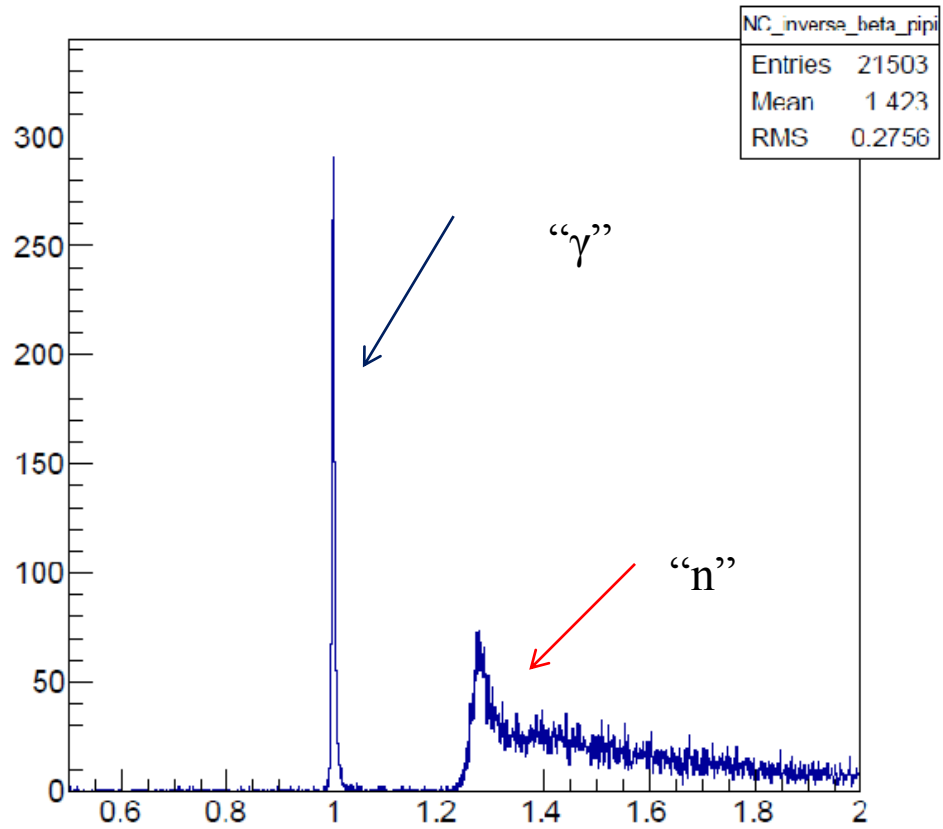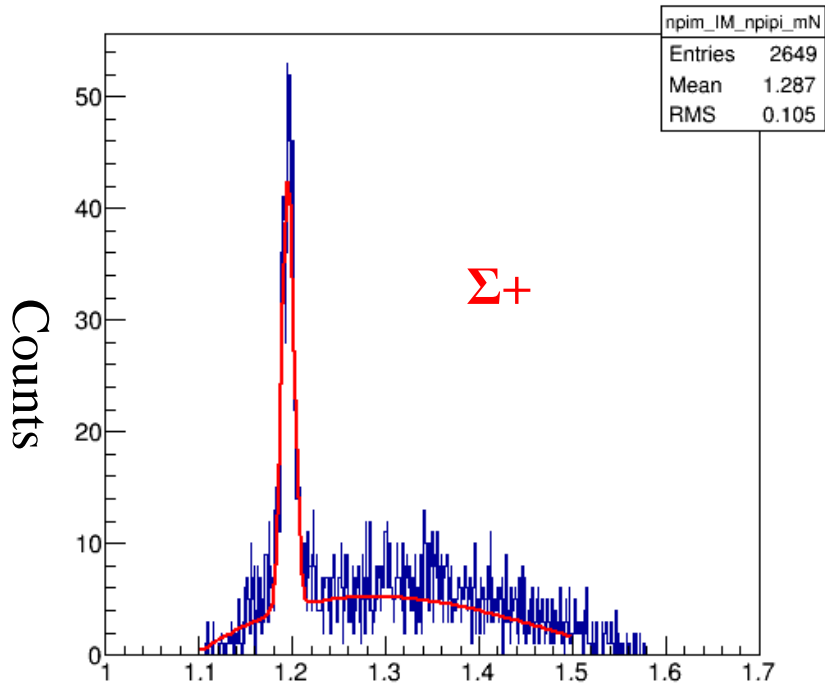
$1/\beta$

Missing neutron identification in d(K^-, $n\pi^+\pi^-$)"X"
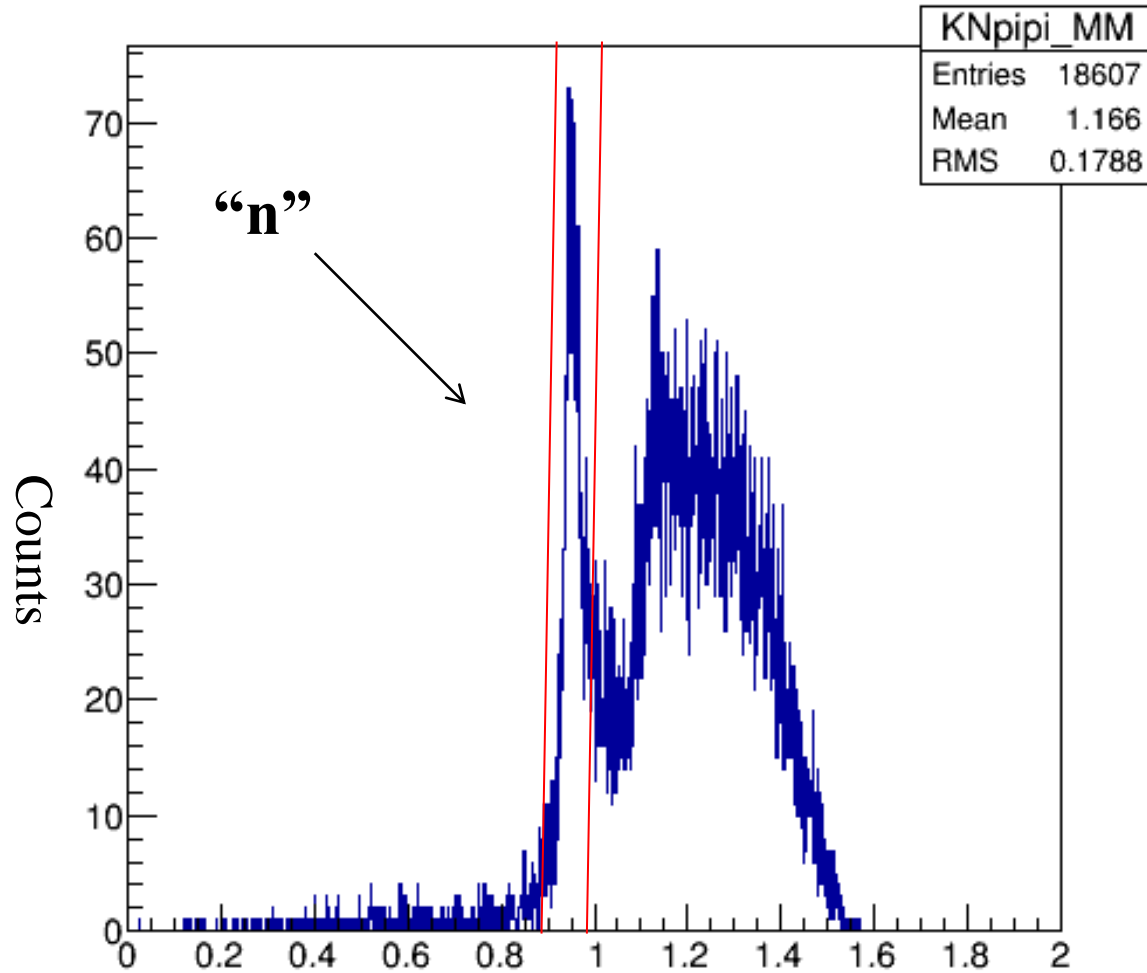
Missing Mass of d(K^-, $n\pi^+\pi^-$)"X" (GeV/c^2)

Identification of Σ+ and Σ-
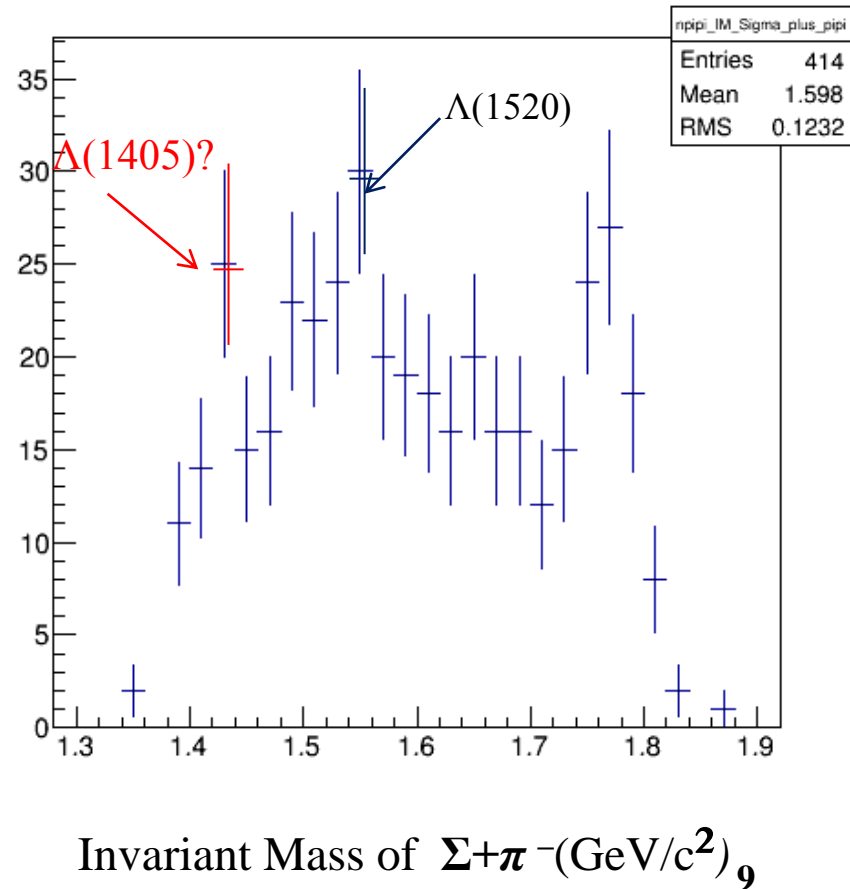

Invariant Mass of nπ⁺ (GeV/c²)
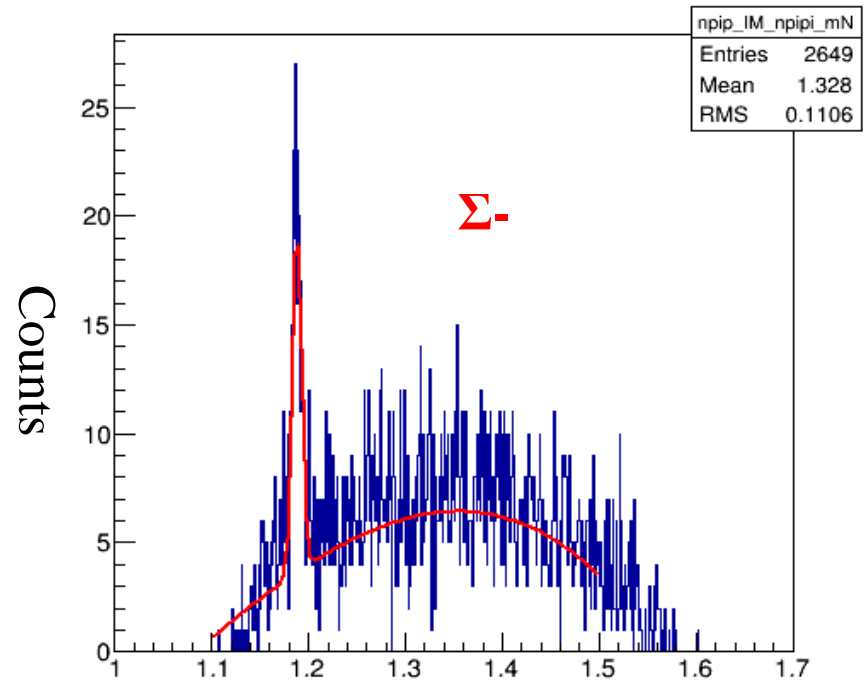
Invariant Mass of nπ⁻ (GeV/c²)
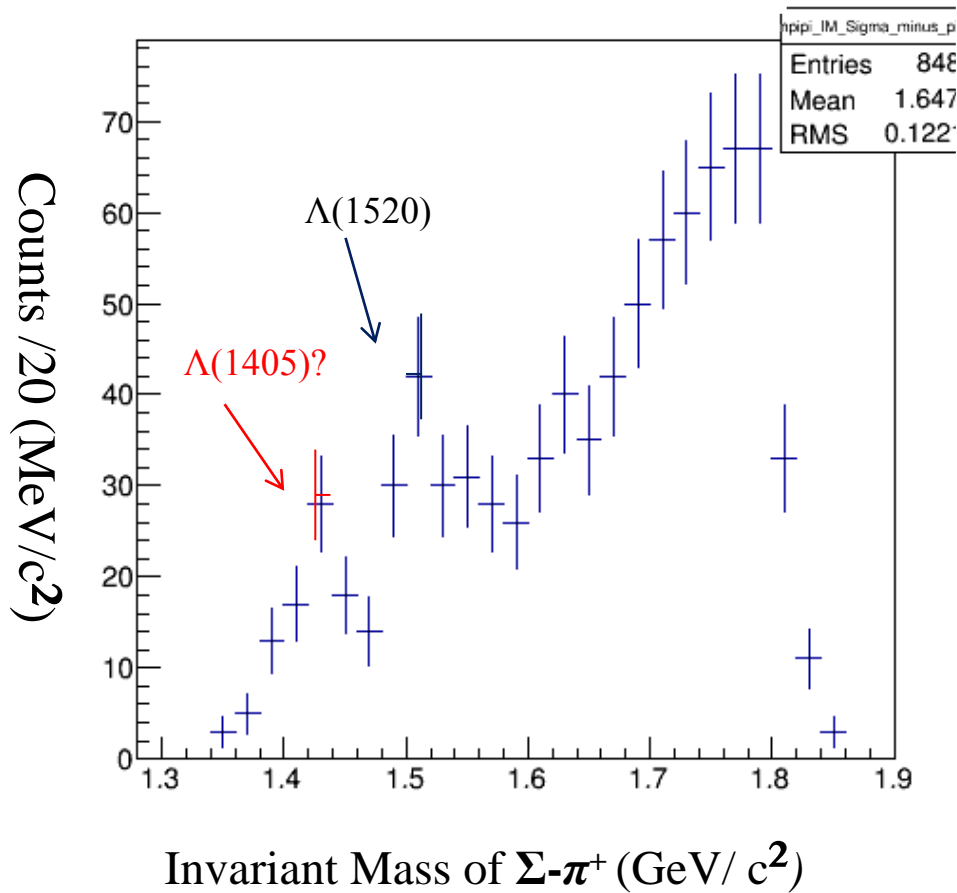
Invariant Mass of $n\pi^+$ and $n\pi^-$.
The strong focusing cross-image corresponds to Σ-decay event

Invariant Mass of the Σ-π⁺ and Σ+π⁻ in the d (K⁻, Σπ)"n" reaction
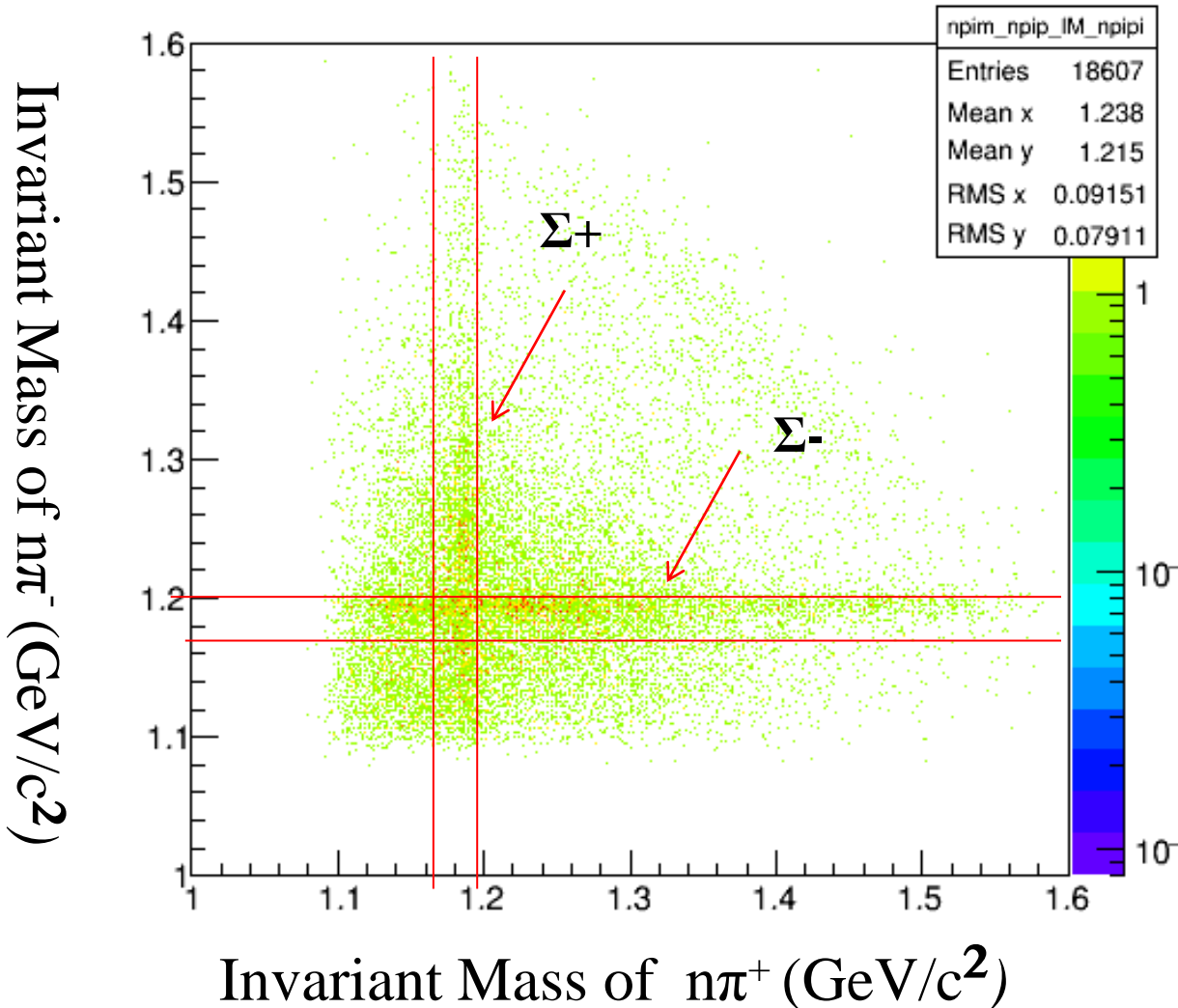
Invariant Mass of Σ-π⁺ (GeV/ c²)

Invariant Mass of Σ+π⁻ (GeV/c²)

Summary:

➢ We measured $\Sigma^{\mp}\pi^{\pm}$ invariant mass spectra in the **d(K$^-$, $\Sigma^{\mp}\pi^{\pm}$)"n"** reaction;

➢ A peak structure for $\Lambda(1405)$ is observed in the $\Sigma^{\mp}\pi^{\pm}$ invariant mass spectra;

➢ We could increase 10 times more statistics;

➢ We expect to measure angular dependence of widely production of $\Lambda(1405)$ in the **d(K$^-$, $\Sigma^{\mp}\pi^{\pm}$)** reaction.