Summer student report

Anton Shumakov

Supervisor: Augusto Ceccucci

NA62 group

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Tasks

The main aim of the NA62 Experiment is to measure cross section of $K^+ \to \pi^+\nu\bar{\nu}$. To perform this NA62 has modern and accurate hardware. Cross section to be measured is relatively small and we have a lot of background. The background rejection starts in trigger system and ends in sophisticated algorithms of final analysis programs. To check quality of date in mediate steps author was asked to made a monitoring tool for $\pi\nu\bar{\nu}$ data. In order to do this I had to reproduce some parts of current $\pi\nu\bar{\nu}$ analysis.

What was done

For main task:

- Reproduced one track selection.
- Reproduced simple μ-π separation using calorimeters.
- Reproduced photon rejection.
- Made a monitoring tool to check quality of $\pi\nu\bar{\nu}$ data.

For incidental tasks:

- Studied 2γ mass distribution in order to understand small tail of π_0 peak.
- Reproduced μ-π separation using RICH.
- Made new simple LKr clusterisation algorithm in order to improve rejection of $K \to 3\pi$ events.

Some results

For simplification of output plot P vs. m^2_{miss} was separated on some controls regions. Number of events in regions is shown on special plots for different triggers in order to check trigger behavior.

Conclusion

Main task was accomplished. Tool was added to NA62 Framework.

Figure 1: Control regions

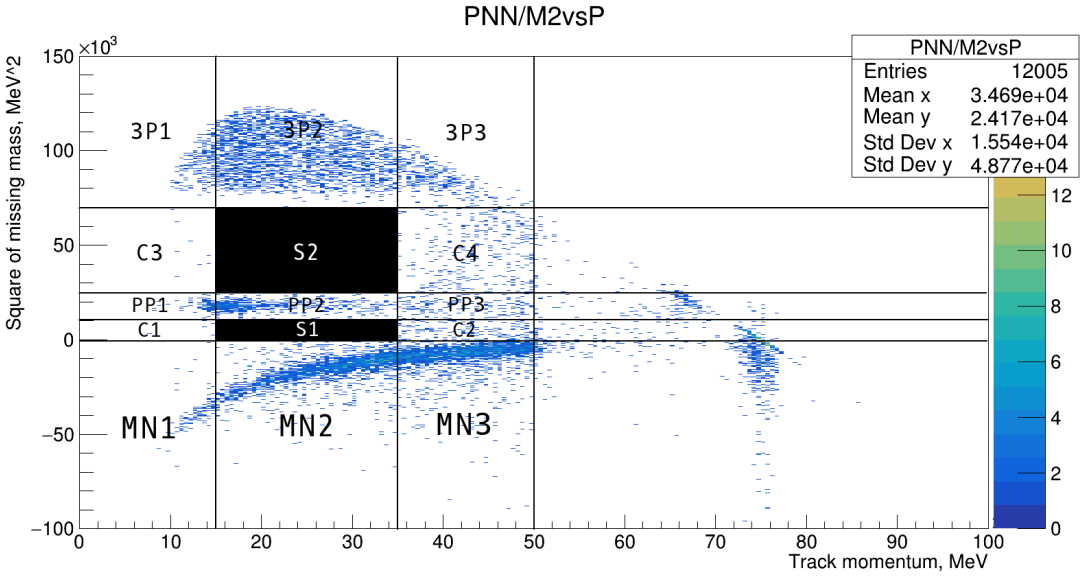

Figure 2: Number of events in control regions for different triggers