KaonLT Analysis Update

(Pion PID Study)

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Mar 23, 2023

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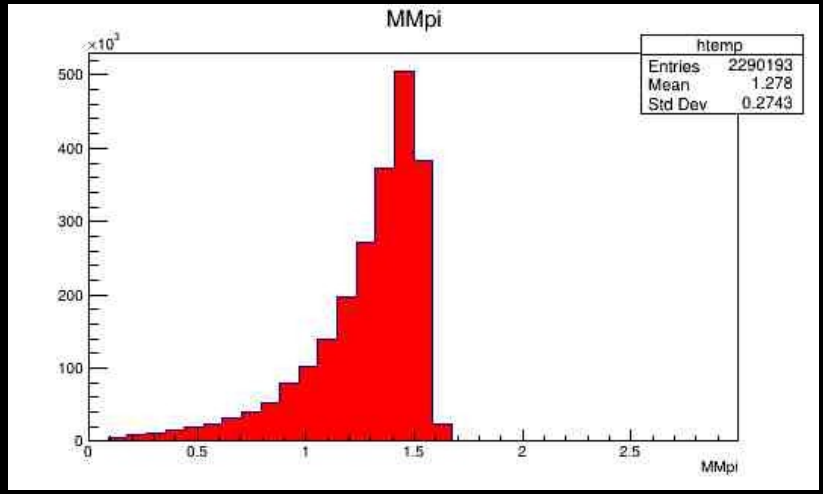
Preview

- Starting to look at Pion PID for High Q2 data.
- Doing a step by step PID analysis.
- Looking at Q2 = 2.1, Low e (center) setting.

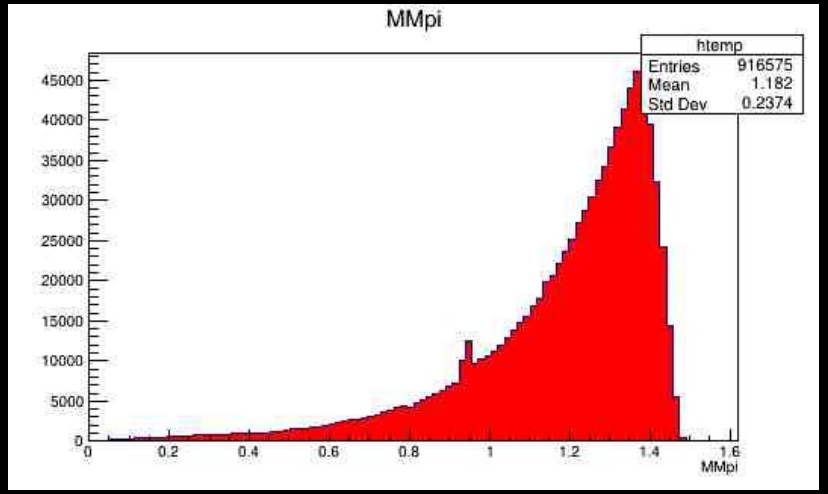
Pion MM (Q = 2.1 Low e)

- All events from the replay.
- Only wide delta cut and good track on both spectrometer at replay level.
- Pretty raw distribution.



Pion MM (Q = 2.1 Low e)

- Now apply acceptance cut on both arms.
  - Goodstarttime, insidedipoleexit
  - Delat, theta and phi

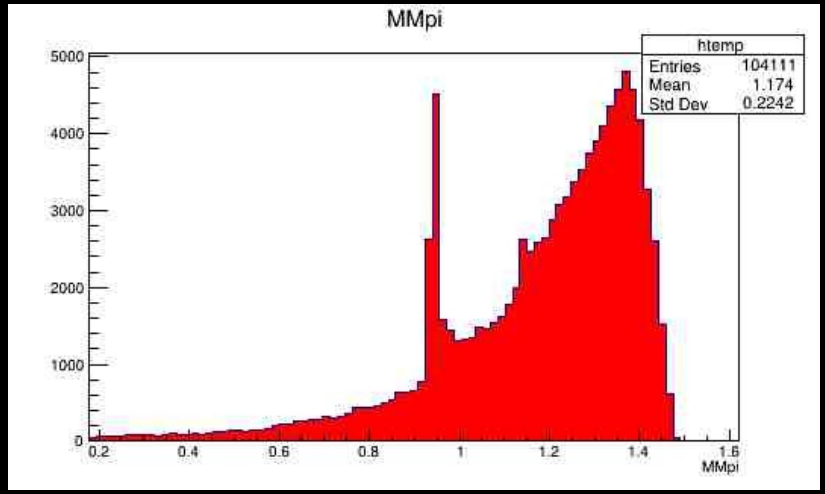


- Still pretty raw but a neutron peak start sneaking up.

Pion MM (Q = 2.1 Low e)

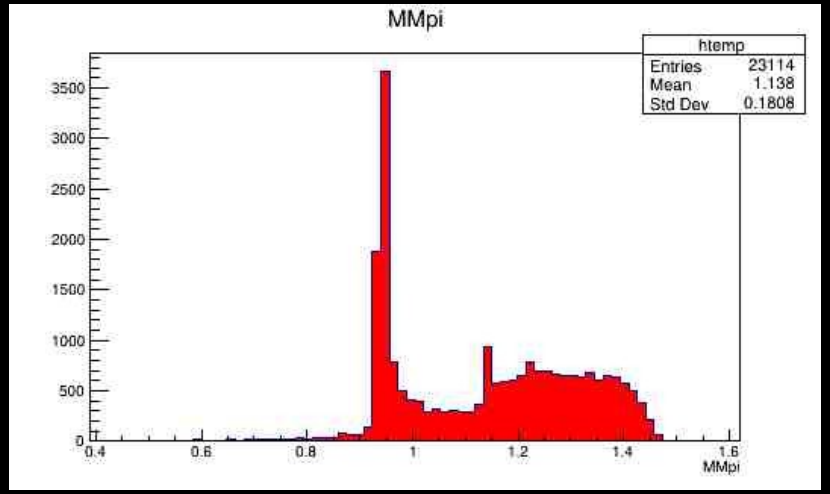
- Apply “some” PID cuts along with the acceptance cuts.
  - SHMS (Aero and Cal)
  - HMS (Cer and Cal)

- More prominent neutron peak but still significant background.



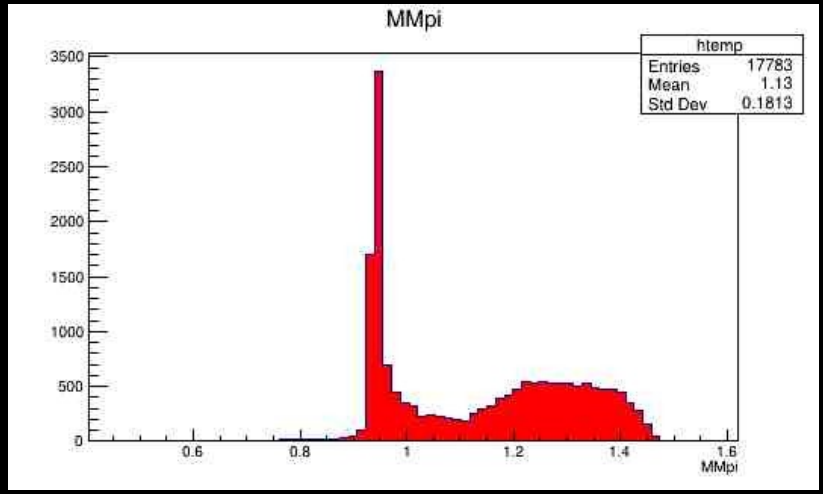
Pion MM (Q = 2.1 Low e)

- Add e-pi Cointime along with previous PID and acceptance.
  - No random subtraction yet
- Sample gets very clean but clear Kaon leak through.



Pion MM (Q = 2.1 Low e)

- Add SHMS HGC along with all previous cuts.
  - Still no random subtraction
- Almost perfectly clean pion sample.
  - No obvious kaon or proton leakage.



Summary

- Starting to pin down PID for exclusive pions for high Q2 data.
- Step by step Pid study shows CT and HGC are most powerful cuts to clean sample.
- Need to apply RF cut, do random subtraction and dummy subtraction.