$B^0 \rightarrow K^* \mu^- \mu^+$ Finalization

Marcin Chrzaszcz
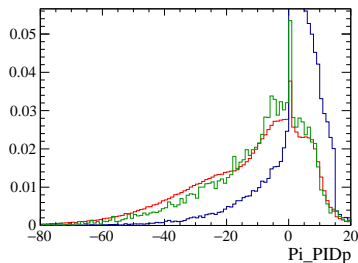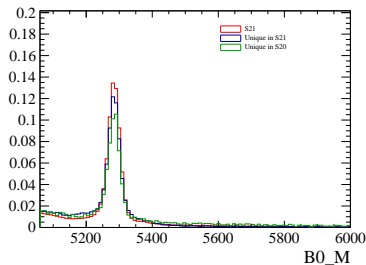
$B^0 \rightarrow K^* \mu^- \mu^+$ meeting, CERN
February 14, 2018

Reminder

$\Rightarrow$ Last week we saw a 4% difference between the S20 and S21.

$\Rightarrow$ Most of the events were located in S21.

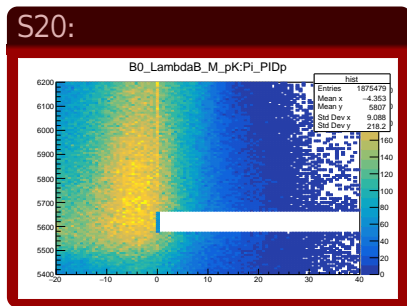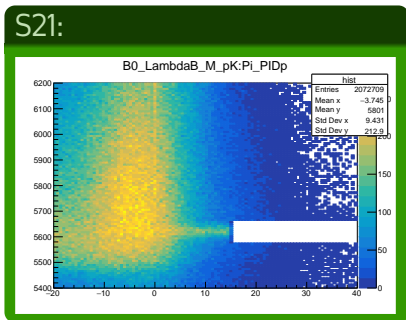$\Rightarrow$ Many theories why... and if this is dangerous...

Overlap

⇛ I have matched the S20 with S21 ntuples by `EventNumber`
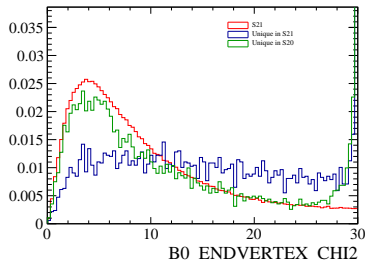

⇛ We have protons unique to S21.

Overlap

S21:

S20:

⇛ Got the nasty bugger

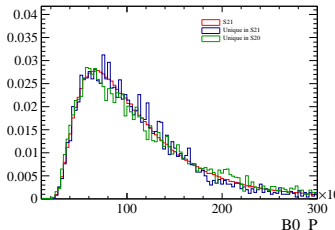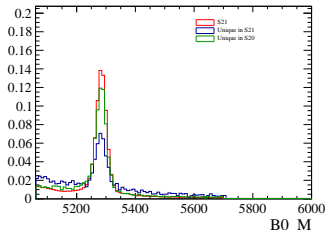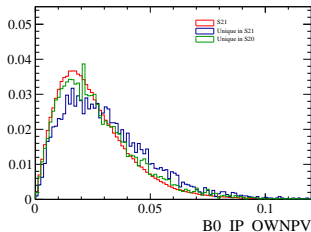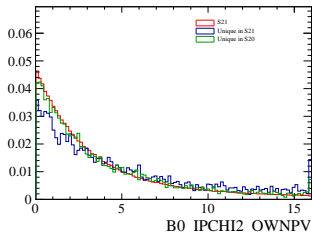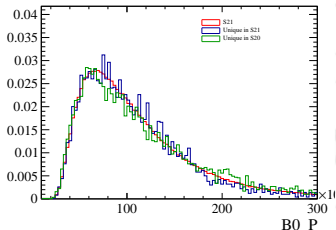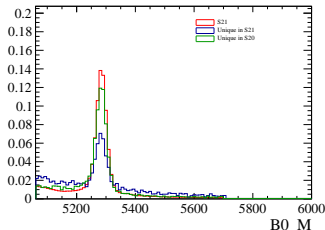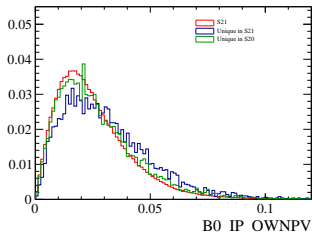# Overlap, after aligning

⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in\in (0.1, 19)$

⇒ Difference in number of events: 0.6%.

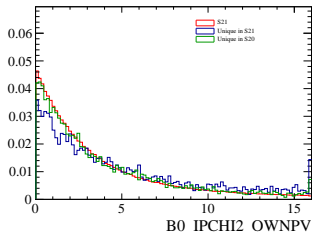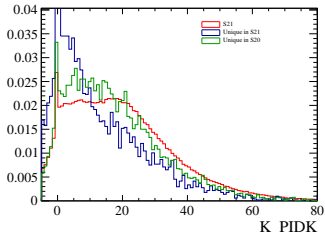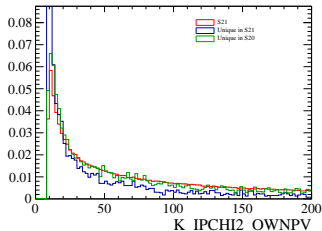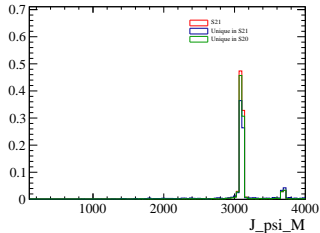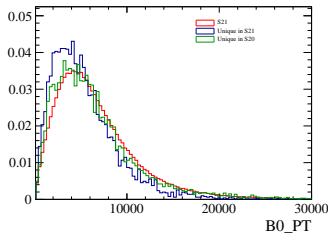⇒ I have check and there are no unique RunNumbers in each of the set.

Overlap, after aligning

⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in (0.1, 19)$

Overlap, after aligning

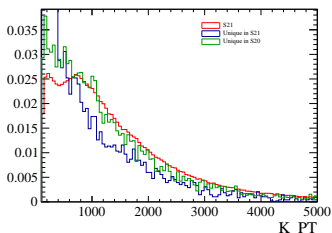$\Rightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in (0.1, 19)$
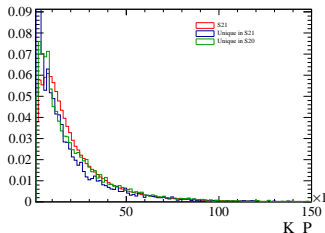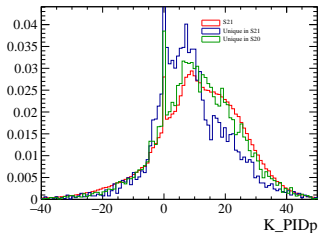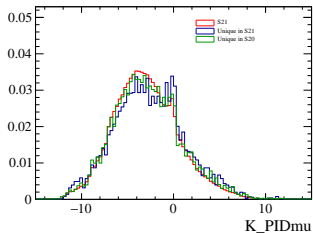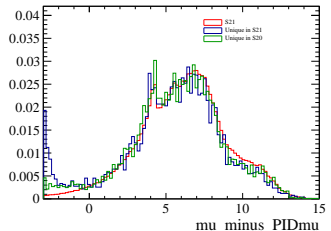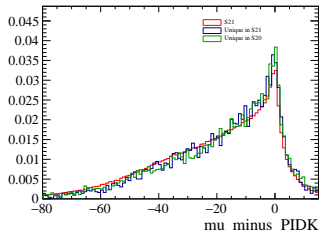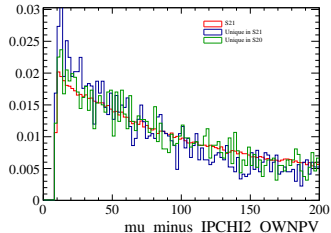
Overlap, after aligning

⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in (0.1, 19)$

Overlap, after aligning

⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in (0.1, 19)$

Overlap, after aligning

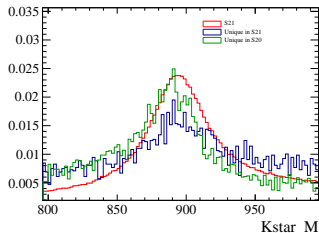$\Rightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in (0.1, 19)$

Overlap, after aligning

$\Rrightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in (0.1, 19)$
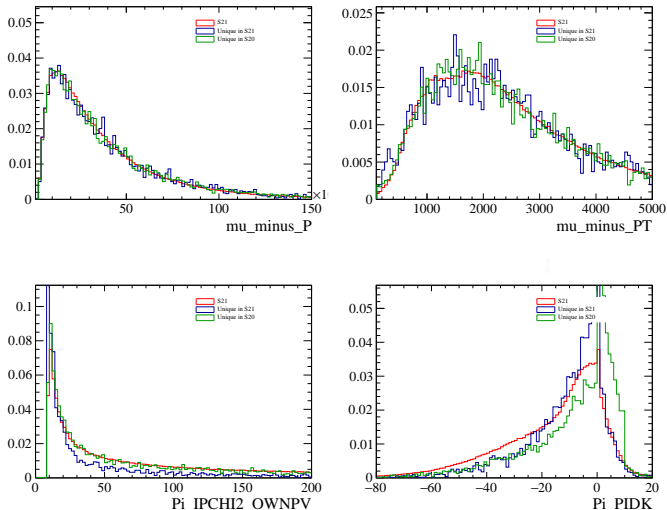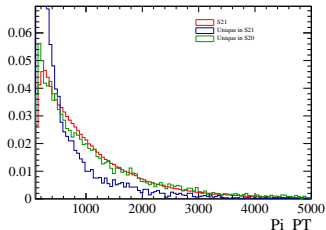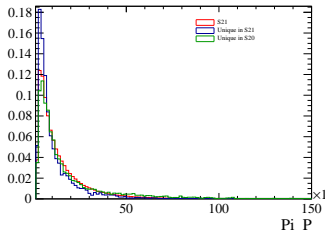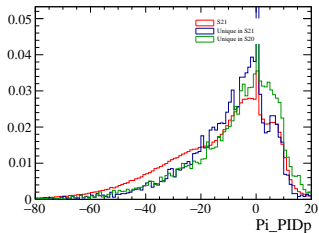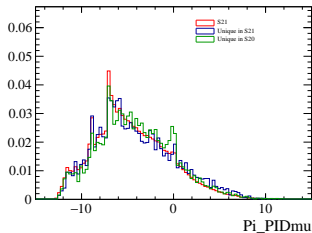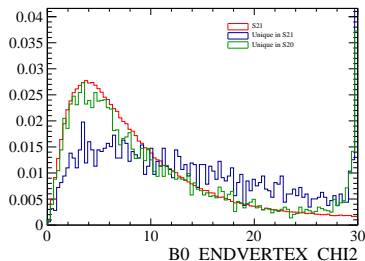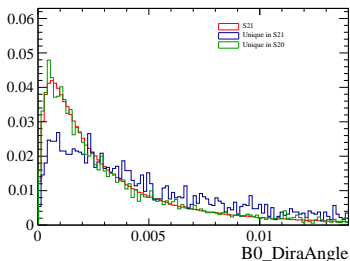
Overlap, after aligning

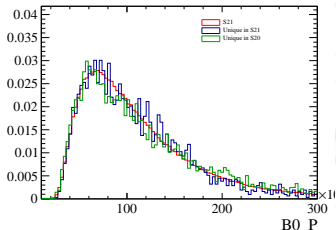⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in (0.1, 19)$

Overlap, after aligning

$\Rrightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in J/\psi \pm 60\mathrm{MeV/c^2s}$
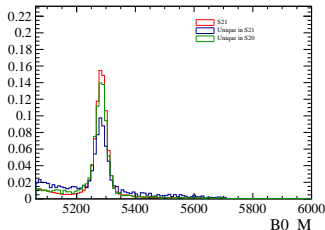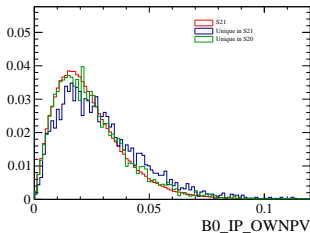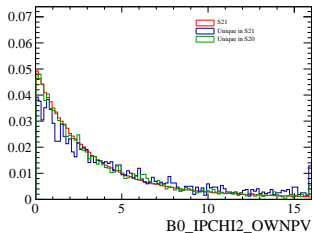
$\Rrightarrow$ Difference in number of events: 0.7%.

Overlap, after aligning

$\Rightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in J/\psi \pm 60\text{MeV/c}^2\text{s}$

Overlap, after aligning

$\Rightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in J/\psi \pm 60 \text{MeV}/\text{c}^2\text{s}$
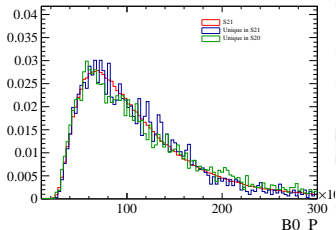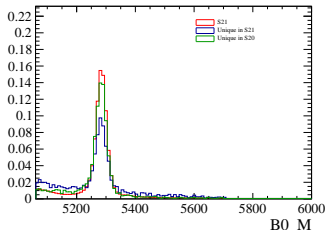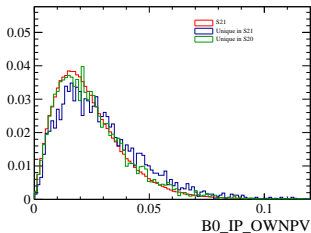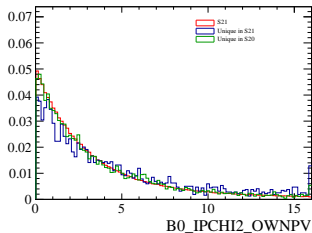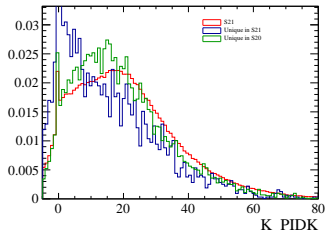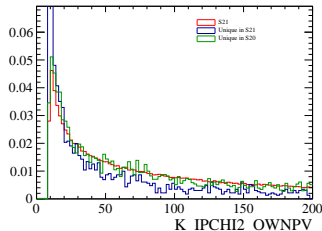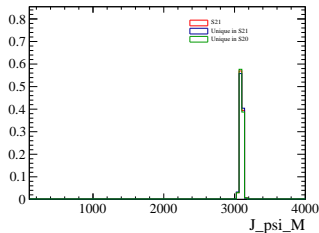
Overlap, after aligning

⇛ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in J/\psi \pm 60\mathrm{MeV/c^2}$s

Overlap, after aligning

$\Rightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in J/\psi \pm 60\text{MeV/c}^2\text{s}$
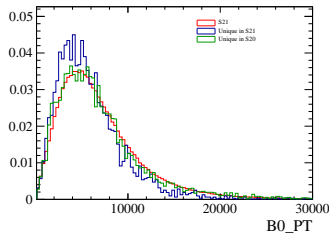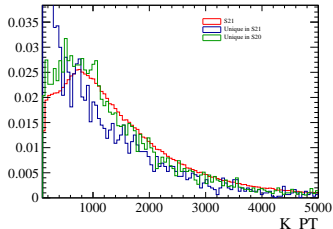
Overlap, after aligning

$\Rightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in J/\psi \pm 60\text{MeV}/\text{c}^2\text{s}$
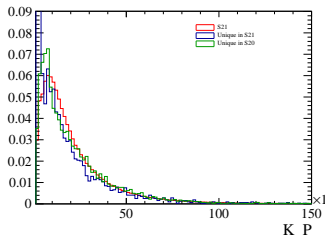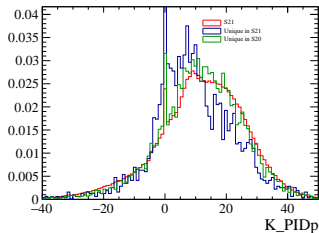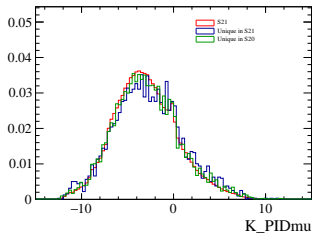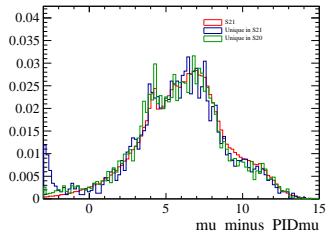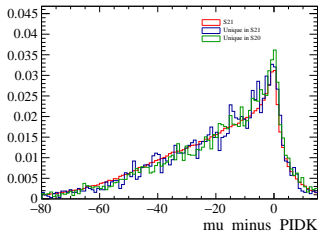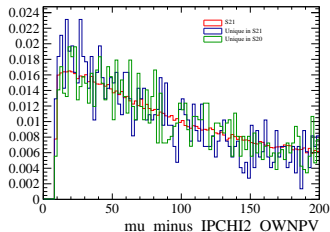
Overlap, after aligning

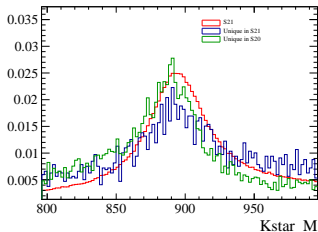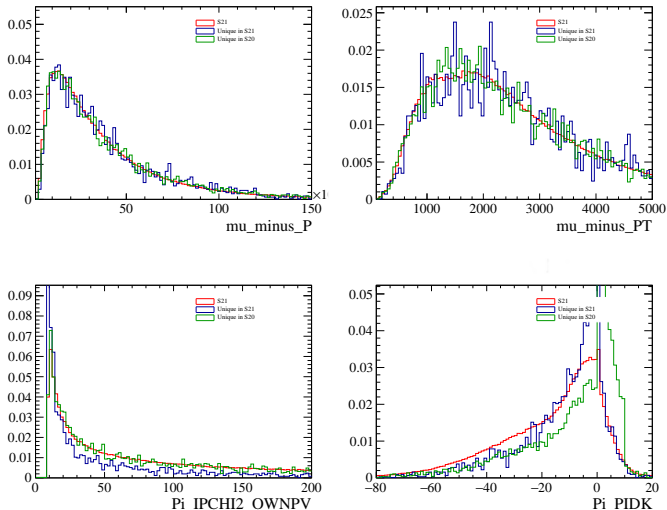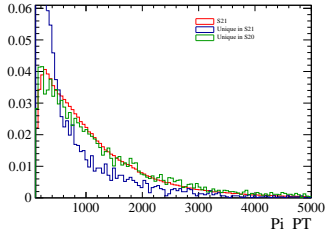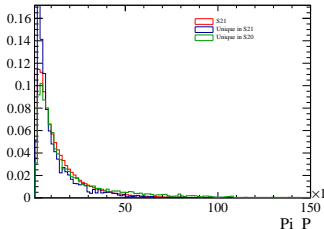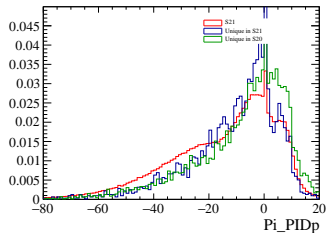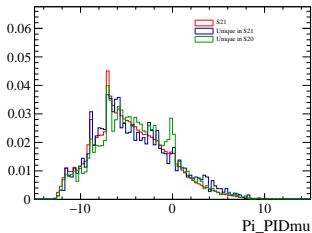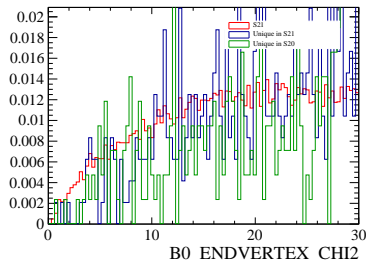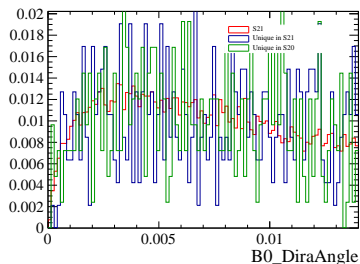⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in J/\psi \pm 60\text{MeV/c}^2\text{s}$

Overlap, after aligning

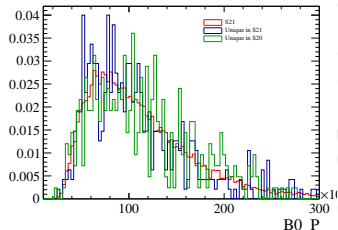$\Rightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5050, 5700)$ and $q^2 \in J/\psi \pm 60\text{MeV}/\text{c}^2\text{s}$
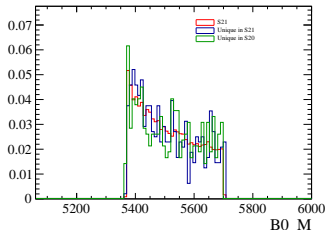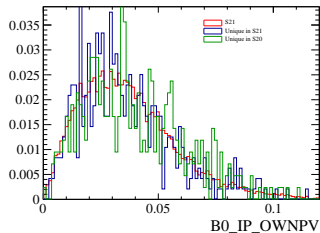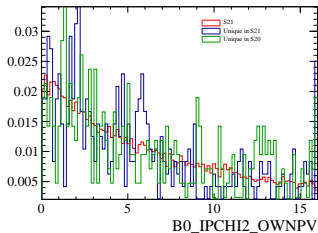
Overlap, after aligning

⇛ Fiducial cut: $m_{K\pi\mu\mu} \in (5370, 5700)$ and $q^2 \in [0.1, 19] - c\bar{c}$

⇛ Difference in number of events: 0.4%.

Overlap, after aligning

$\Rrightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5370, 5700)$ and $q^2 \in [0.1, 19] - c\bar{c}$

$B^0 \to K^* \mu^- \mu^+$ *Update*

Overlap, after aligning

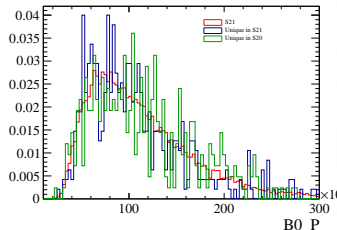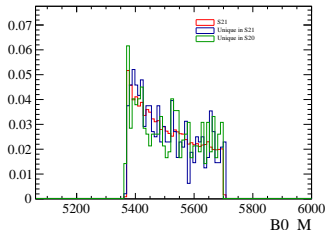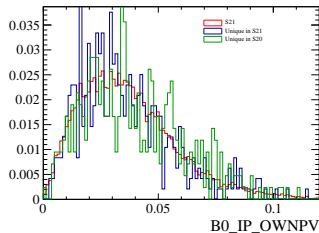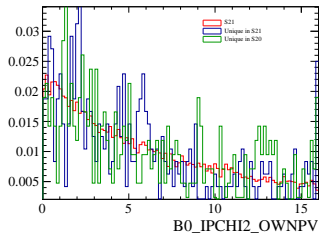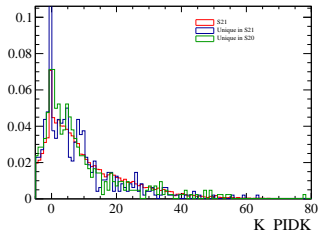⇛ Fiducial cut: $m_{K\pi\mu\mu} \in (5370, 5700)$ and $q^2 \in [0.1, 19] - c\bar{c}$
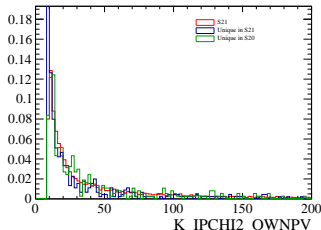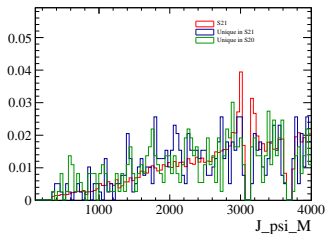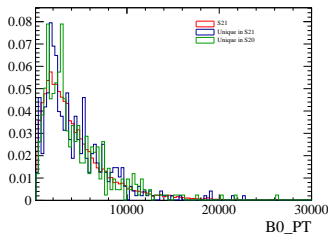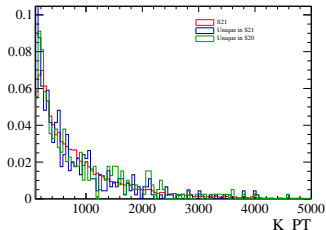
Overlap, after aligning

⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5370, 5700)$ and $q^2 \in [0.1, 19] - c\bar{c}$

Overlap, after aligning

$\Rightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5370, 5700)$ and $q^2 \in [0.1, 19] - c\bar{c}$
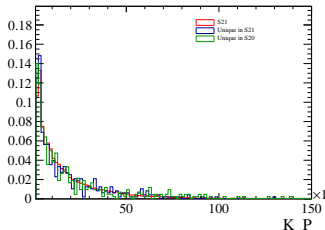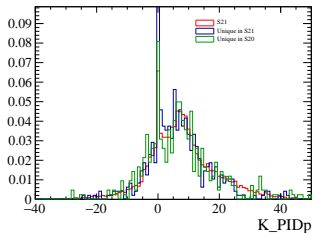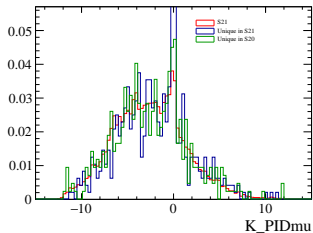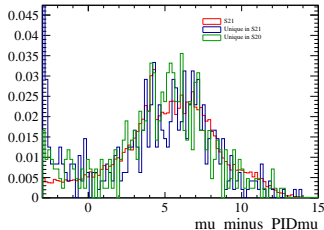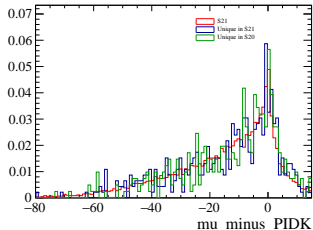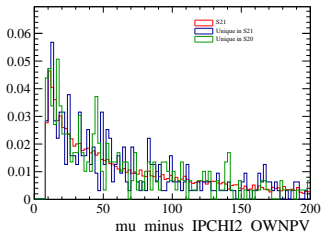
Overlap, after aligning

⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5370, 5700)$ and $q^2 \in [0.1, 19] - c\bar{c}$

Overlap, after aligning

$\Rrightarrow$ Fiducial cut: $m_{K\pi\mu\mu} \in (5370, 5700)$ and $q^2 \in [0.1, 19] - c\bar{c}$
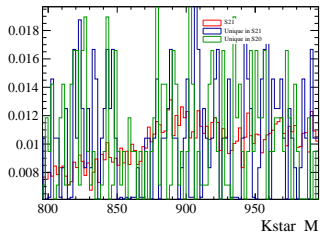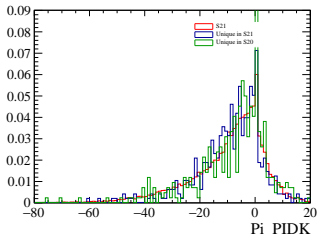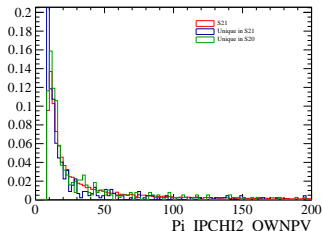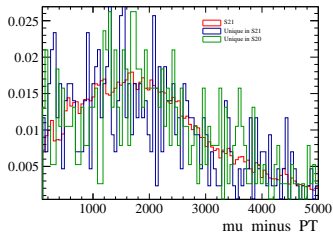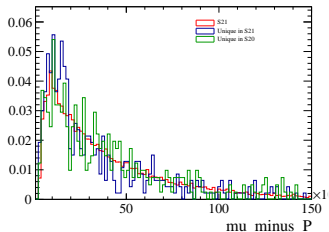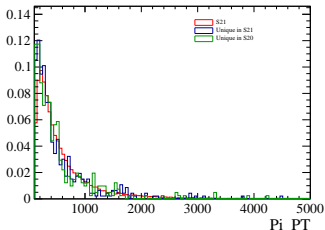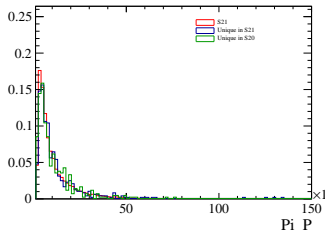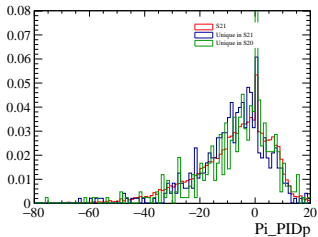
Overlap, after aligning

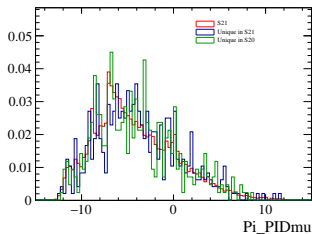⇒ Fiducial cut: $m_{K\pi\mu\mu} \in (5370, 5700)$ and $q^2 \in [0.1, 19] - c\bar{c}$

Conclusions

⇒ There is a sub percent difference between the two samples.

⇒ The difference is constatish in different phase space regions.

⇒ No obvious cut missing the distributions look ok.

Backup