

Comparing alignment versions in 2022 data with V^0 decays

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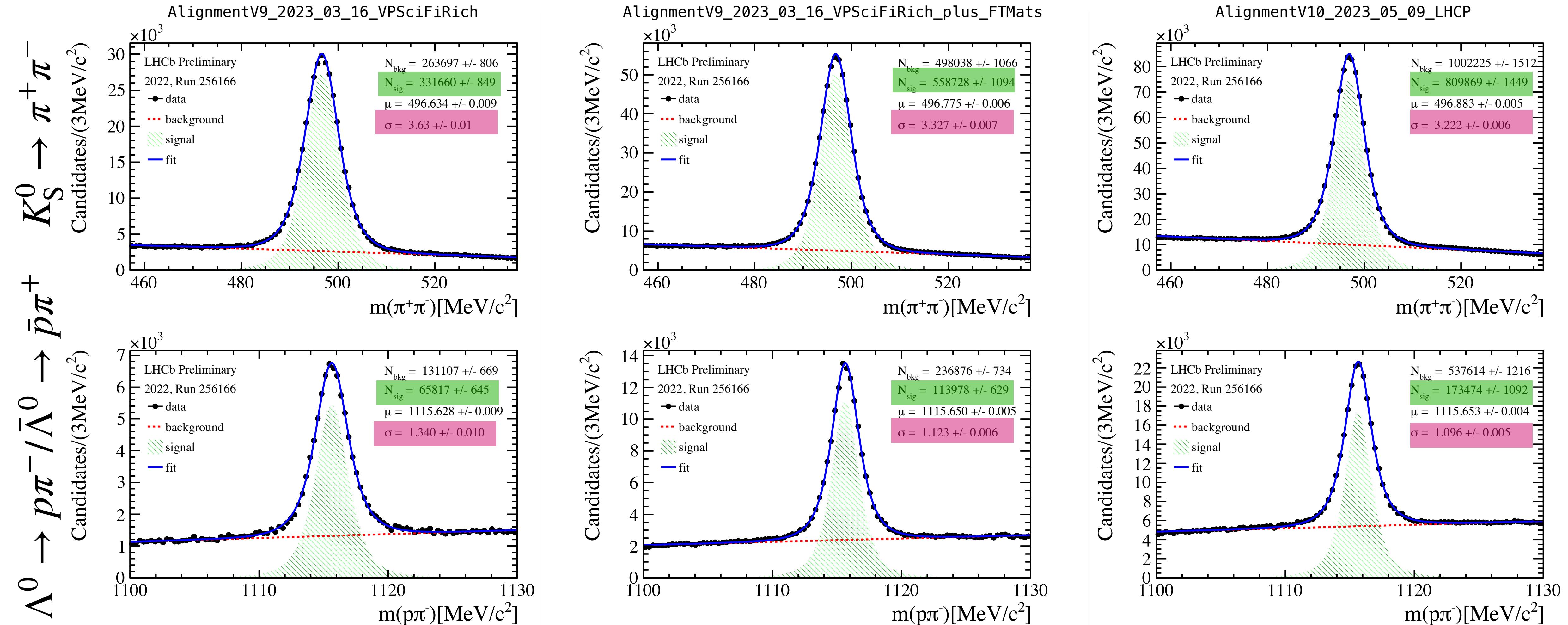
WP4/5 meeting, 25.05.23



Setup

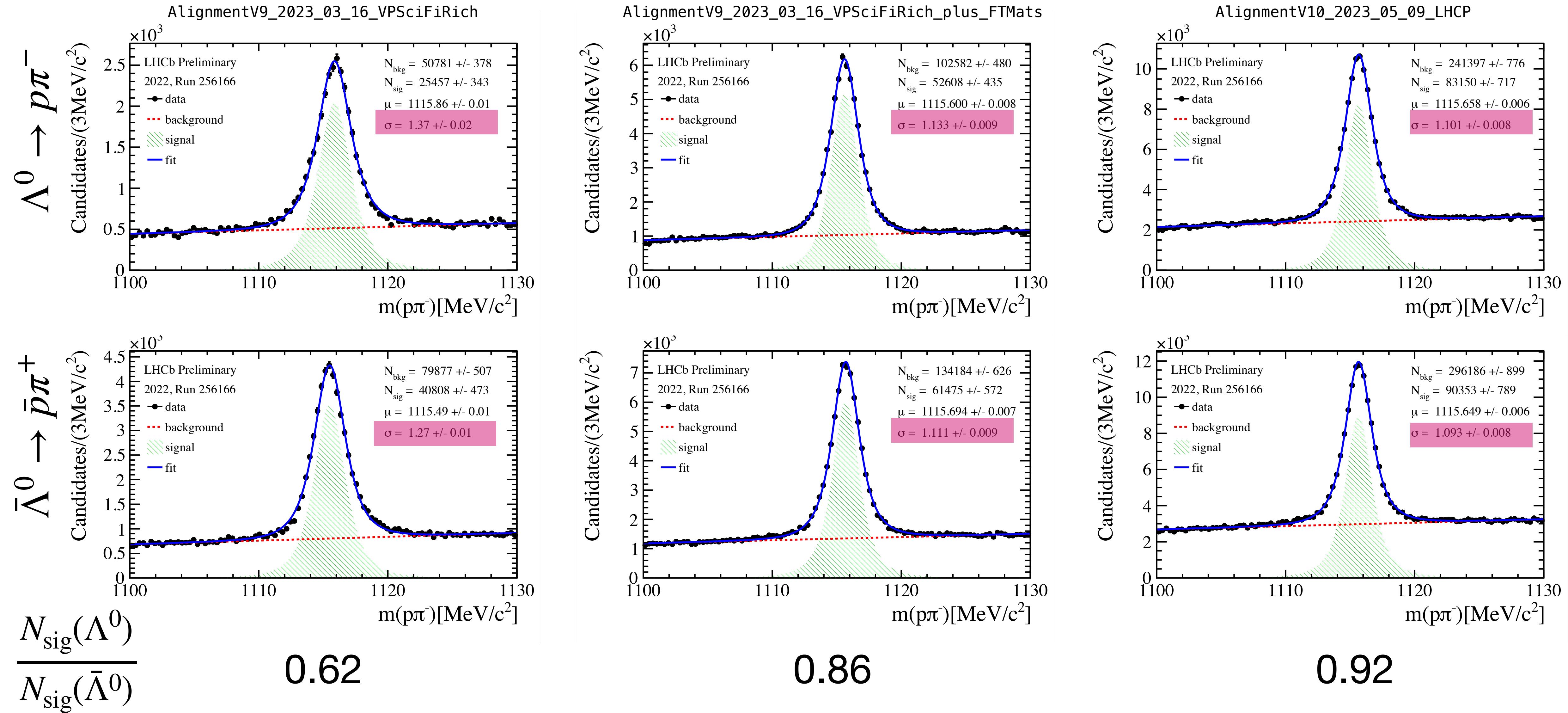
- Locally running passthrough lines in Moore that produce $K_S^0 \rightarrow \pi^+ \pi^-$ and $\Lambda^0 \rightarrow p \pi^-$ candidates on 10% of the events of Run 256166 (MagDown), no selection requirements other than a loose mass window
- Offline selecting V^0 candidates with
$$\mathcal{F}_{\text{IP}}(V^0 \rightarrow h^+ h^{(\prime)-}) = \log_{10}(\text{IP}(h^+)) + \log_{10}(\text{IP}(h^{(\prime)-})) - \log_{10}(\text{IP}(V^0)) > 1$$
- testing different Alignment tags:
 - AlignmentV9_2023_03_16_VPSciFiRich
 - AlignmentV9_2023_03_16_VPSciFiRich_plus_FTMats
 - AlignmentV10_2023_05_09_LHCP
- Using passthrough data which makes track/candidate multiplicities independent of HLT1 reconstruction and decisions

First glimpse at V10 alignment

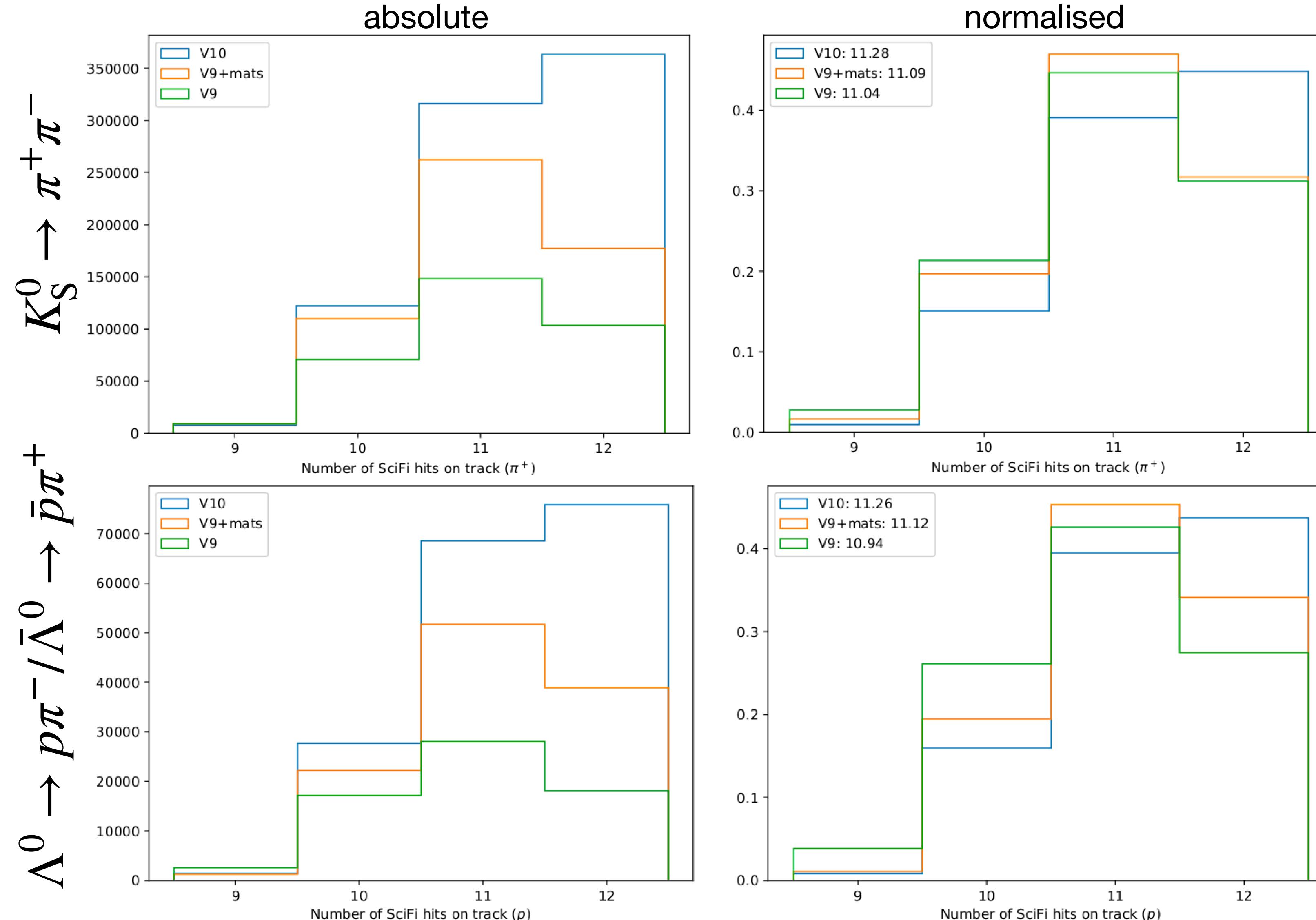


- Huge improvement in **signal yields** ($> \times 2$ from V9 to V10), **mass peak resolutions** slightly improve

First glimpse at V10 alignment



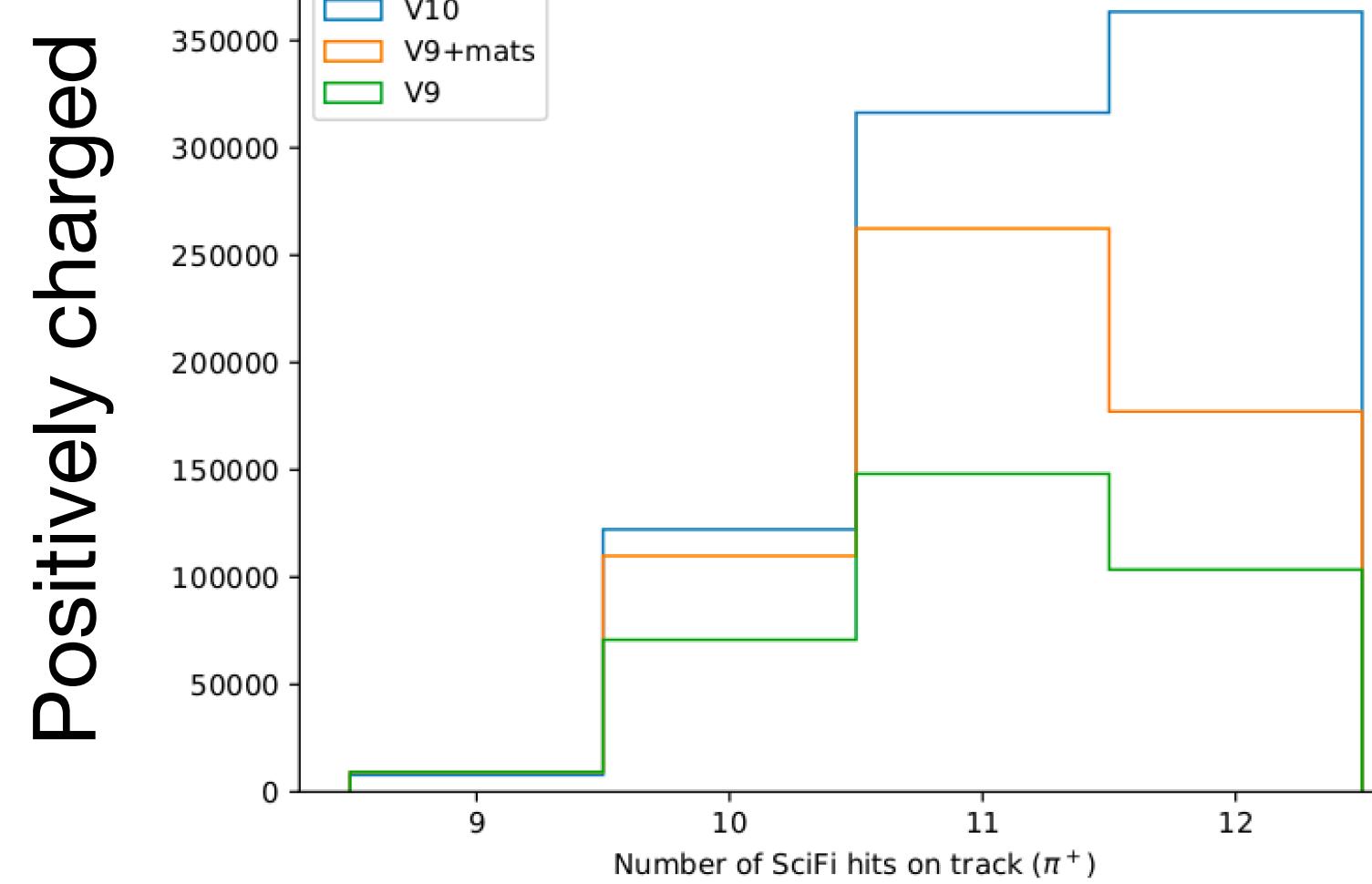
SciFi hits on tracks on sweighted data



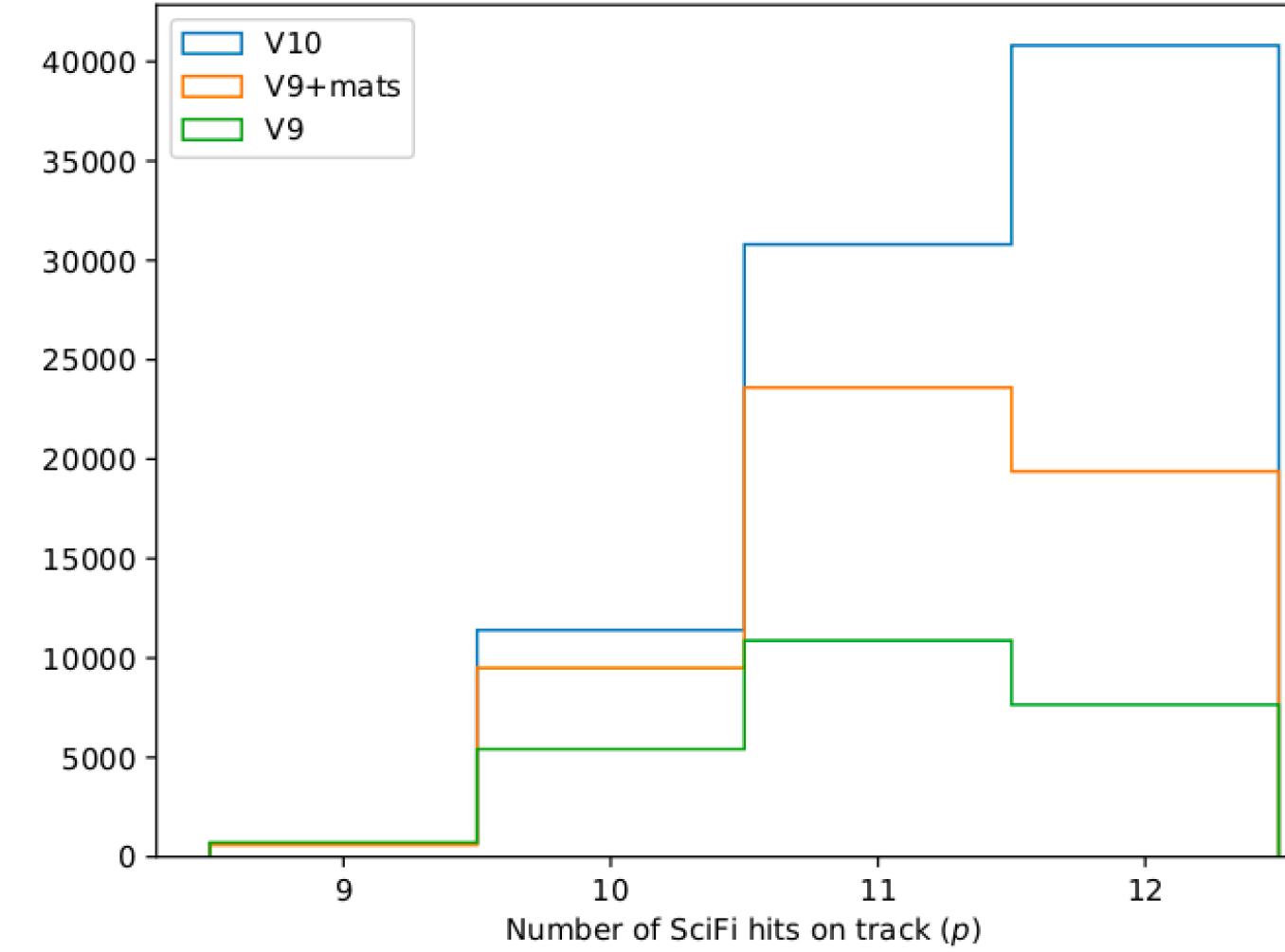
- **Number of reconstructed tracks with 10, 11, 12 hits improves a lot from version to version**
- V9+Mats alignment recovered a lot of tracks with 11 hits
- V10 alignment recovered a lot of tracks with 12 hits → likely many of the 11 hit tracks went to 12, that's why the increase in 11 hit tracks might be smaller compared to V9+mats
- **Significantly higher average number of SciFi hits on tracks**
- Note that these tracks are required to form a V^0 signal candidate, some features might due to that

SciFi hits on tracks - split by charge

$K_S^0 \rightarrow \pi^+ \pi^-$



$\Lambda^0 \rightarrow p \pi^-$



$\bar{\Lambda}^0 \rightarrow \bar{p} \pi^+$

