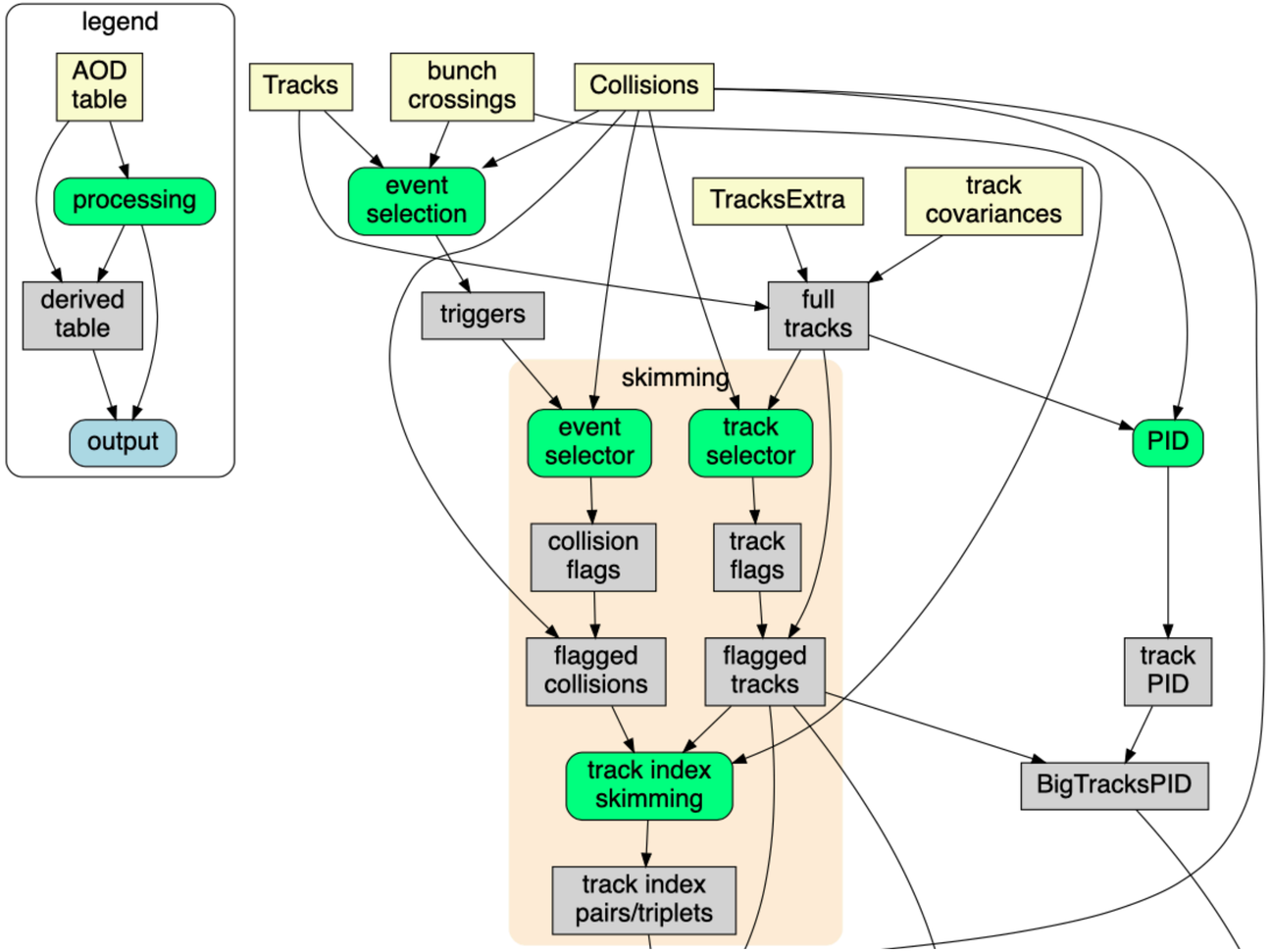
Status Report

Jinjoo Seo*
Inha University*

2021.08.11

- HF analysis in O2



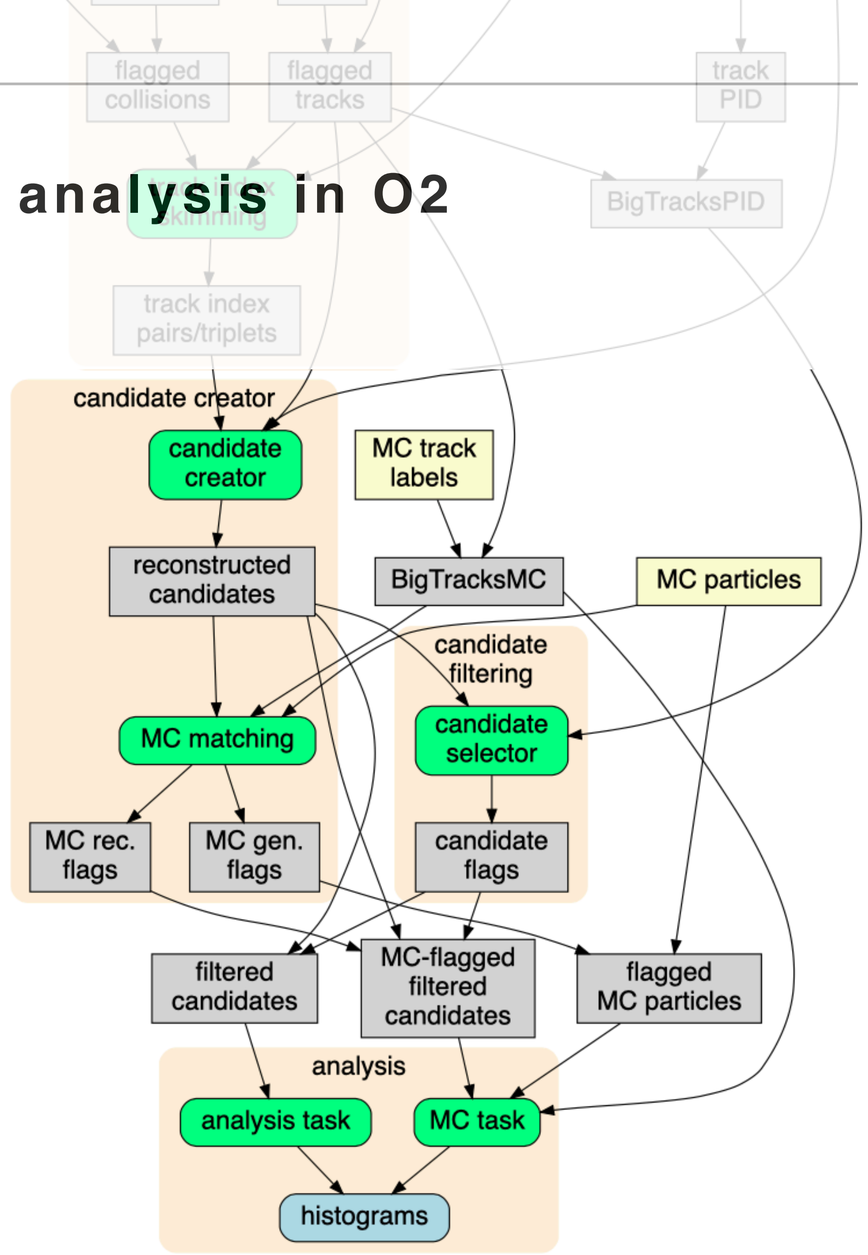
- **AOD table (AO2D.root)**
  - Example : Collisions

Name		Getter	Type	Comment
o2::soa::Index	GI	globalIndex	int64_t	
o2::aod:💥:BCId	I	bcId	int32	Most probably BC to where this collision has occured
o2::aod:💥:PosX		posX	float	X Vertex position in cm
o2::aod:💥:PosY		posY	float	Y Vertex position in cm
o2::aod:💥:PosZ		posZ	float	Z Vertex position in cm
o2::aod:💥:CovXX		covXX	float	Vertex covariance matrix
o2::aod:💥:CovXY		covXY	float	Vertex covariance matrix
o2::aod:💥:CovXZ		covXZ	float	Vertex covariance matrix
o2::aod:💥:CovYY		covYY	float	Vertex covariance matrix

- **Skimming**
  - (Pre)Track selection; Default track cut
  - src : HFTrackIndexSkimsCreator.cxx

Cuts vairbales	cuts
AOD Filter Bit	4(Standard cuts with very loose DCA)
Number of crossed rows	>70
Number of crossed rows over TPC findable cluster	>0.8
Number of TPC PID clusters	>50
ITS/TPC refit	TRUE
Number of ITS cluster	≥ 3
p_T (GeV/c)	>0.5
$\lvert\eta\rvert$	<0.8
SPD hit	both

- HF analysis in O2



Status

- **Candidate creator**
  - Candidate prepare; MC matching
  - src : HFCandidateCreator2(3,Cascade)Prong.cxx

```
DECLARE_SOA_TABLE(HfCandProng2Base, "AOD", "HFCANDP2BASE", //!
                  // general columns
                  HFCAND_COLUMNS,
                  // 2-prong specific columns
                  hf_cand::PxProng0, hf_cand::PyProng0, hf_cand::PzProng0,
                  hf_cand::PxProng1, hf_cand::PyProng1, hf_cand::PzProng1,
                  hf_cand::ImpactParameter0, hf_cand::ImpactParameter1,
                  hf_cand::ErrorImpactParameter0, hf_cand::ErrorImpactParameter1,
                  hf_track_index::Index0Id, hf_track_index::Index1Id,
                  hf_track_index::HFflag,
                  /* dynamic columns */
                  hf_cand_prong2::M<hf_cand::PxProng0, hf_cand::PyProng0, hf_cand::PzProng0,
                  hf_cand_prong2::M2<hf_cand::PxProng0, hf_cand::PyProng0, hf_cand::PzProng0
                  hf_cand_prong2::ImpactParameterProduct<hf_cand::ImpactParameter0, hf_cand:
                  hf_cand_prong2::CosThetaStar<hf_cand::PxProng0, hf_cand::PyProng0, hf_cand
```

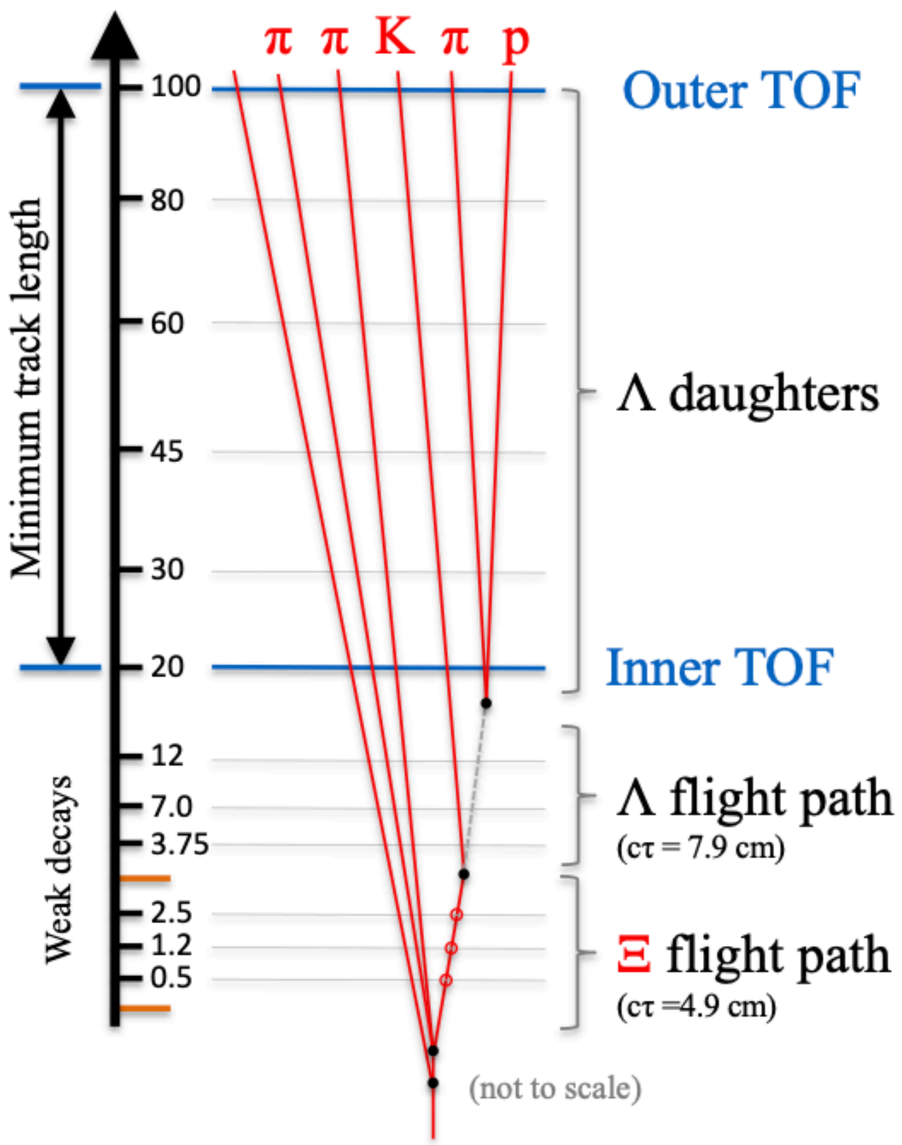
- **Candidate filtering**
  - Apply selection criteria;
  - src : HFD0(Lc…)CandidateSelector.cxx

$\lvert n\sigma_{TOF}\rvert$	<3
$\lvert n\sigma_{TPC}\rvert$	$>-3.9+1.2\cdot x-0.094\cdot x^2, <3$

- **Analysis**
  - Define output(histogram, etc..)

- Xic+ analysis in O2

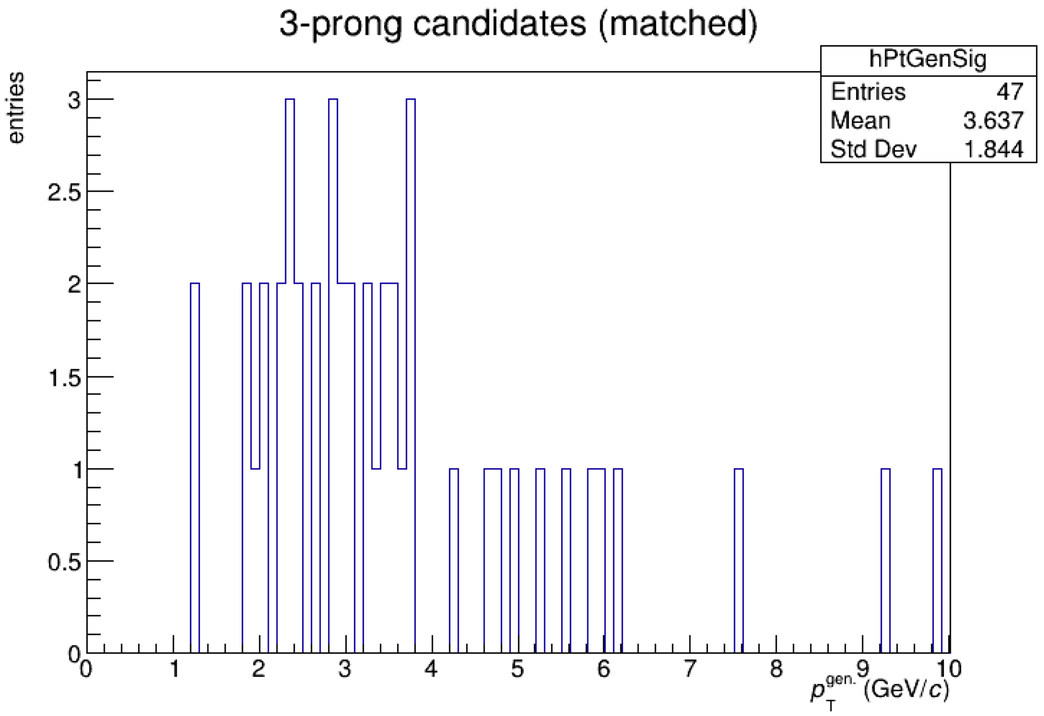
- **MC Sample**
  - Name : CCBAR_LctopKpi_10Mevents_scenario3_17022021
  - Type : ccbar pp @ 14TeV
  - MC generator config : $DELPHESO2_ROOT/examples/pythia8/pythia8_ccbar.cfg
  - MC decay config : $O2DPG_ROOT/MC/config/PWGHF/pythia8/decayer/force_hadronic_D(_forceLcChannel1).cfg
  - Detector LUT: 20cm.scenario3
    - https://github.com/preghenella/DelphesO2/blob/master/src/lutWrite.scenario3.cc
  - Number of events : **15M**
  - Ξ_c^+ decay channel
    - $\Xi_c^+ \to pK^{*0}$
    - $\Xi_c^+ \to pK^-\pi^+$
    - $\Xi_c^+ \to \Xi^{*0}\pi^+$
    - $\Xi_c^+ \to \Xi^-\pi^+\pi^+$

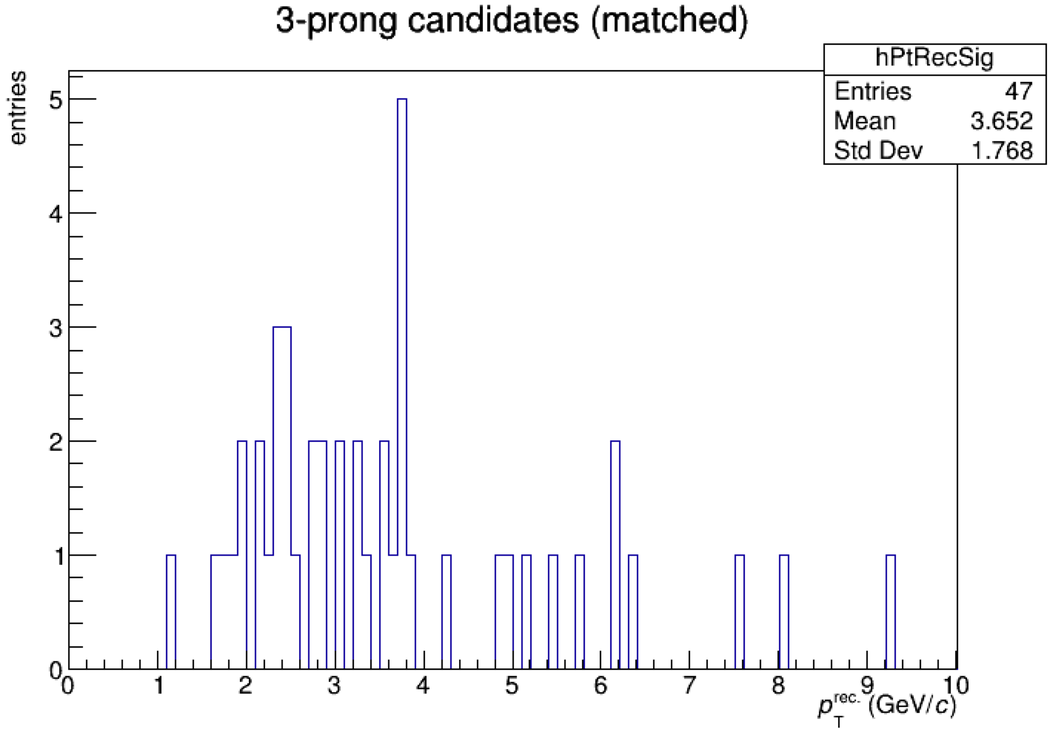


- Xic+ analysis in O2

- **Xic+ cuts**
  - Use default cuts in O2 XicPlusTask
    - https://github.com/AliceO2Group/Run3Analysisvalidation/blob/master/codeHF/dpl-config_run5_hf.json
- **Efficiency**
  - Can not calculate due to too low statistics!

```
"hf-xic-topkpi-candidate-selector": {
    "d_pTCandMin": "0.",
    "d_pTCandMax": "36.",
    "d_FilterPID": "false",
    "d_pidTPCMinpT": "0.15",
    "d_pidTPCMaxpT": "1.0",
    "d_pidTOFMinpT": "0.5",
    "d_pidTOFMaxpT": "4.0",
    "d_TPCNClsFindablePIDCut": "70.",
    "d_nSigmaTPC": "3.",
    "d_nSigmaTPCCombined": "5.",
    "d_nSigmaTOF": "3.",
    "d_nSigmaTOFCombined": "5."
}
```





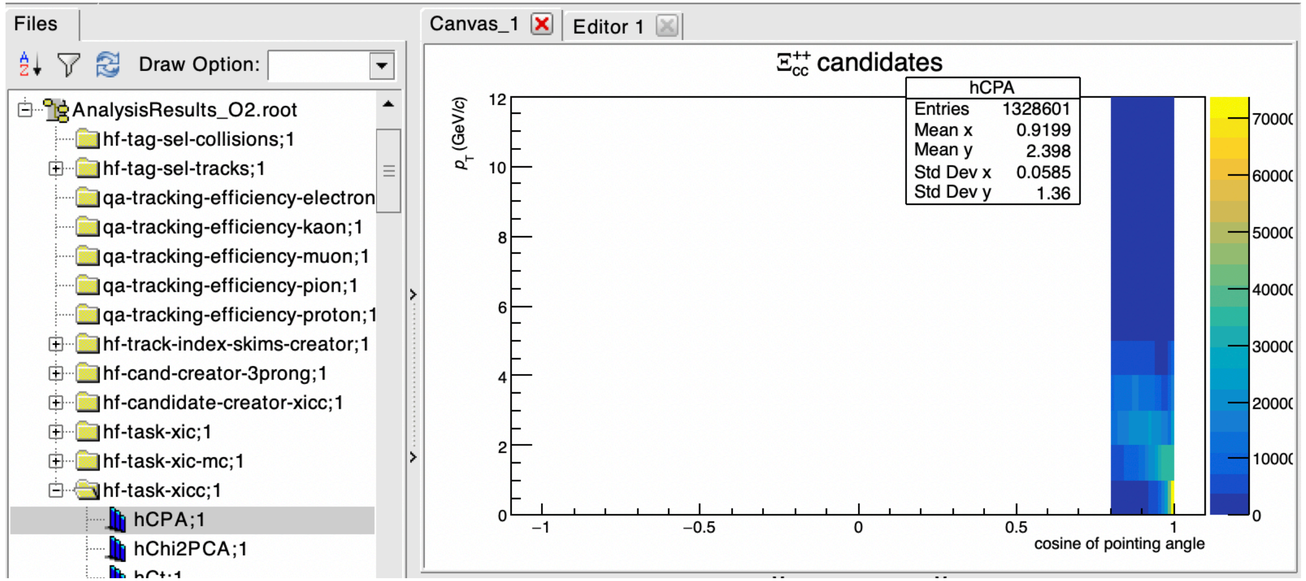
- Xicc+ analysis in O2

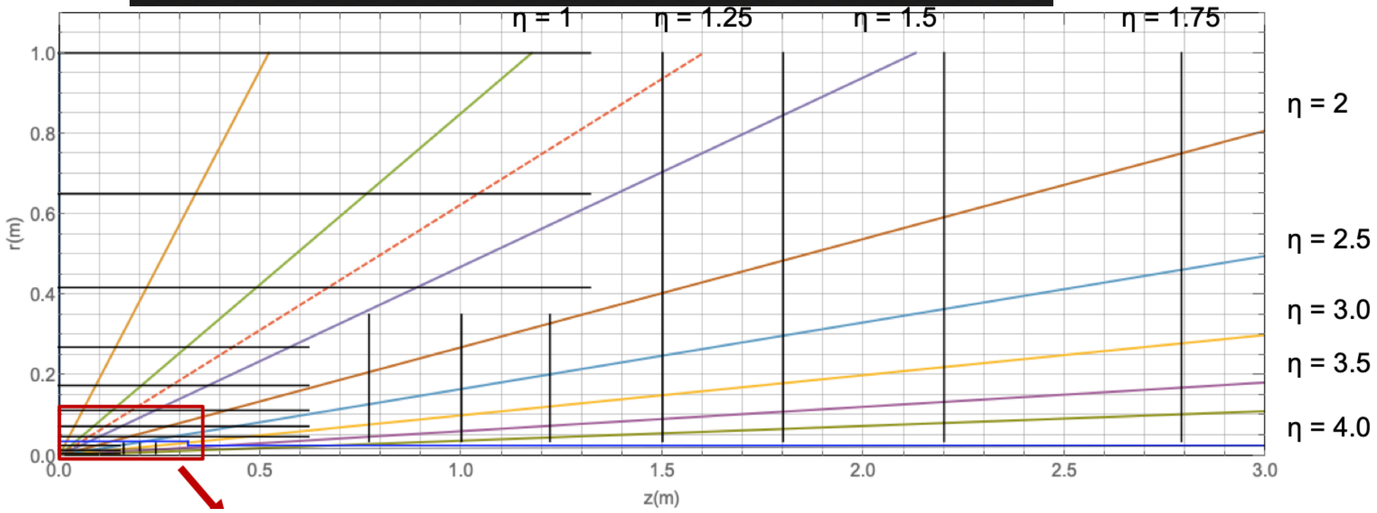
- **Status**
  - Implement the Xicc task in O2 -> Need to develop
  - Generating MC for Xicc

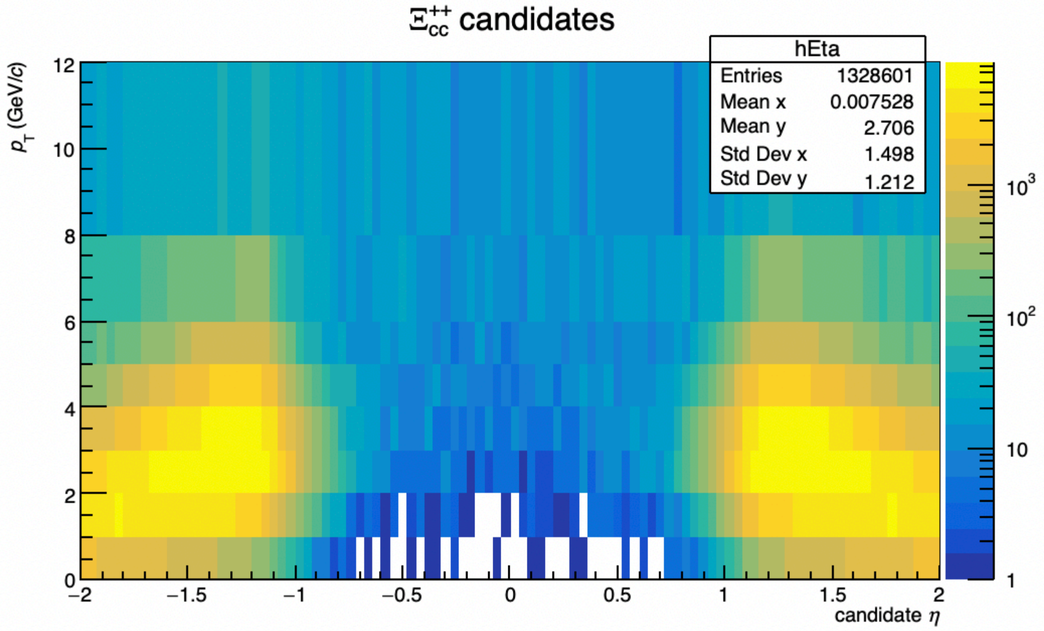
```
##changing tha ctau value in mm/c
4422:tau0=0.07680000000
### changing the ctau value in mm/c
4232:tau0=0.132

### add Xi_cc++ decay in to Lambda_c+ K- pi^+ pi^+
4422:addChannel = 1 0.5 0 4122 -321 211 211
4422:addChannel = 1 0.5 0 4232 211
4422:onMode = off

#4422:onIfMatch = 4122 -321 211 211
4422:onIfMatch = 4232 211
```







Back up