Status Ξ^0_c analysis, Oct. 11 (2022), CKim

- **New analysis code (*AliAnaTaskSEXic0SL*)**

  - Notable updates

    a. Tree structure: previous e-Xi pair only → event/electron/cascade independently

    b. Some cuts' applying position changed (e.g., e+e- min mass > 0.05 during preselection)

    c. Updated some cuts suspected as a bug (e.g., cascade decay lengths)

    d. For better consistency and human error reduction,

      d-1. Moved most of the hard-coded values to the header, if possible

      d-2. Matched variables' type to the official ALICE library (i.e., uses Double_t if the official function returns Double_t)

      d-3. Checked 3 sample AODs for compatibility check (pp data, pp MC, and pA data)

    e. etc: removed most of the histograms for now

  - Crosschecks
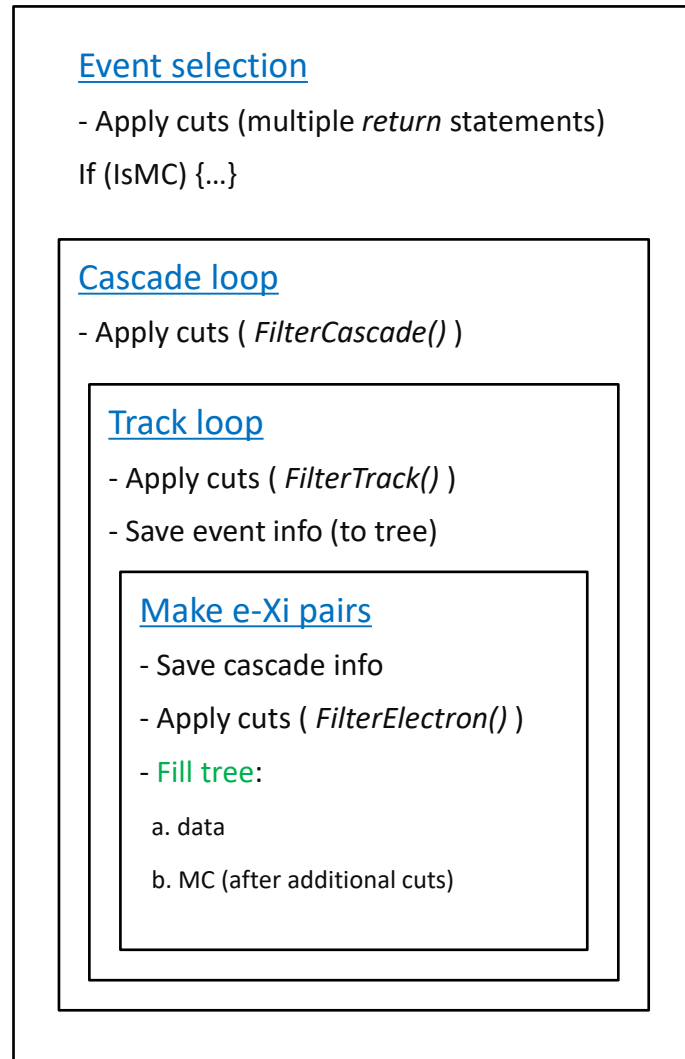
    a. Done: online selection (by events, by reco. cascasdes, and by reco. tracks)

    b. To do: offline selection (especially e-Xi pairs' yields, mass, pT, etc)
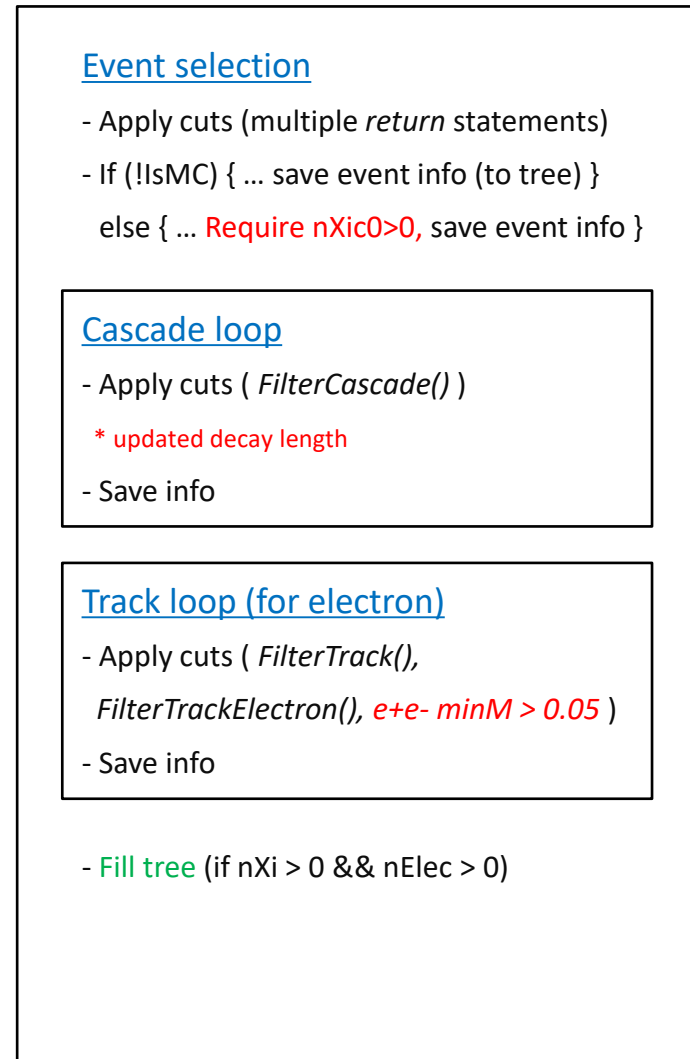
  - To do

    a. Add missing variables saved in form of histograms in old code (need to check old offline analysis routines)

    b. Add offline analysis routines (e.g., unfolding)

Comparison   Structure change for online selection code (AliAnalysisTask...)

Old

New

Event selection

- Apply cuts (multiple *return* statements)

If (IsMC) {...}

Cascade loop

- Apply cuts (*FilterCascade()*)

Track loop

- Apply cuts (*FilterTrack()*)

- Save event info (to tree)

Make e-Xi pairs

- Save cascade info

- Apply cuts (*FilterElectron()*)

- Fill tree:

  a. data

  b. MC (after additional cuts)

Event selection

- Apply cuts (multiple *return* statements)

- If (!IsMC) { ... save event info (to tree) }

  else { ... Require nXic0>0, save event info }

Cascade loop

- Apply cuts (*FilterCascade()*)

 * updated decay length

- Save info

Track loop (for electron)

- Apply cuts (*FilterTrack(),*

  FilterTrackElectron(), e+e- minM > 0.05)

- Save info

- Fill tree (if nXi > 0 && nElec > 0)

$\longleftrightarrow$

xCheck   Old ↔ New, online selection (1)

- **Eventwise selection**

  - Most of cuts stay the same (function invoking, cut values, etc)

    a. Invoking order can be different

    b. For MC, new code saves an event only if nXic0 (true) > 0

    c. Function *CheckOrigin()* updated:

       c-1. Old code checks consequently if origin is 5 (b-quark = b_flag) or NOT

       c-2. New code checks origin more strictly (if 4 (c-quark) or 5) and returns the value

  - xCheck: exactly match if above item "b" is off

xCheck   Old ↔ New, online selection (2)

- **Track selection**

    - Most of cuts stay the same (function invoking, cut values, etc)

        a. Invoking order can be different

        b. Applied e+e- pair (unlike-signed tracks) min mass > 0.05 cut during online selection
           (old code applied it offline)

    - xCheck: right after *FilterTrack()* and *FilterElectron()* applied, before min mass cut:

        a. Data: exact match

        b. MC: results are slightly different - it seems the function *AliPIDResponse::NumberOfSigmasTOF<TPC>*
           newly evaluated for every execution? <u>Even the same code (either Old or New) shows different results</u>

xCheck   Old ↔ New, online selection (3)

- **Cascade selection**

  - Most of cuts stay the same

  - Transverse radius or Decay length?

    → Old code uses 'transverse radius @ each decay vertex (e.g., V0 vertex) as a cut': intended? Valid? Effect?

  - xCheck: right after *FilterCascade(),* exactly match for both data/MC if the same cuts are used

Decay lengths, old vs. new,
by 5 LHC18p runs @ Grid

Newly xChecked, Oct. 5

LAST SLIDE

Backup   xCheck: eventwise selection, data, pp

Backup　　xCheck: eventwise selection, mc, pp

Backup xCheck: track selection, data, pp

Backup   xCheck: cascade selection, data, pp (Sep. 29)

Backup xCheck: cascade selection, MC, pp (Sep. 29)