

Anti-neutrons at Belle II

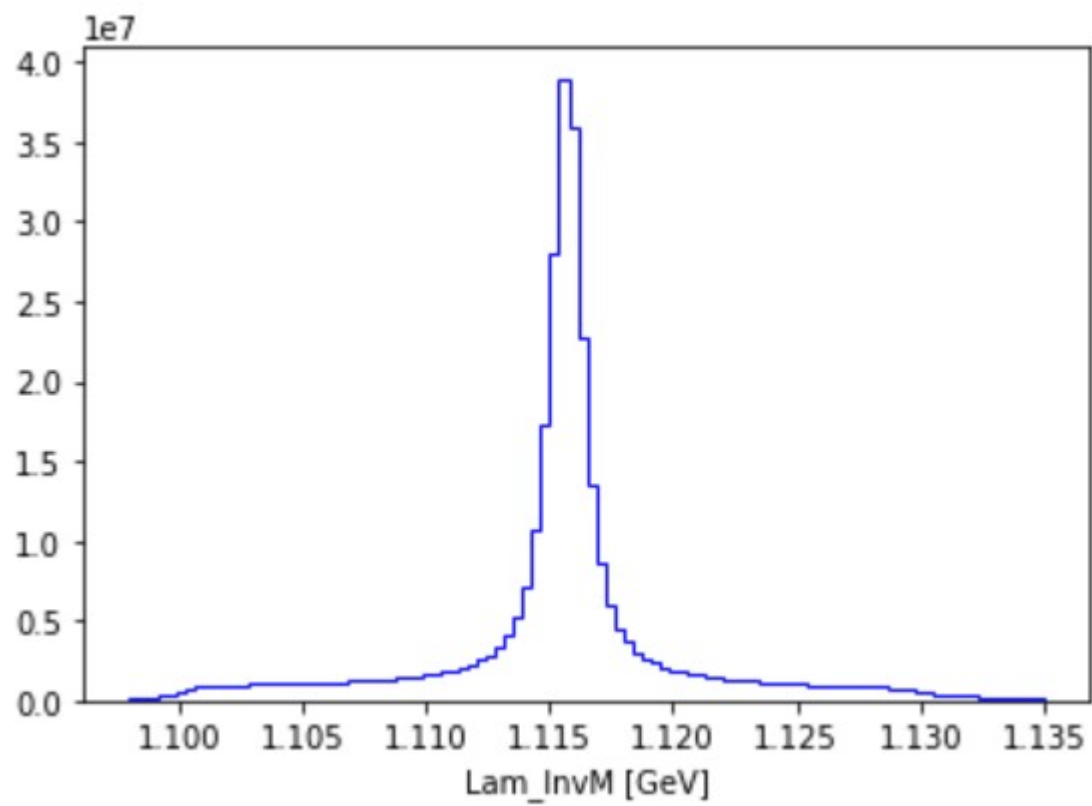
MANTRA Meeting
28/07/2025

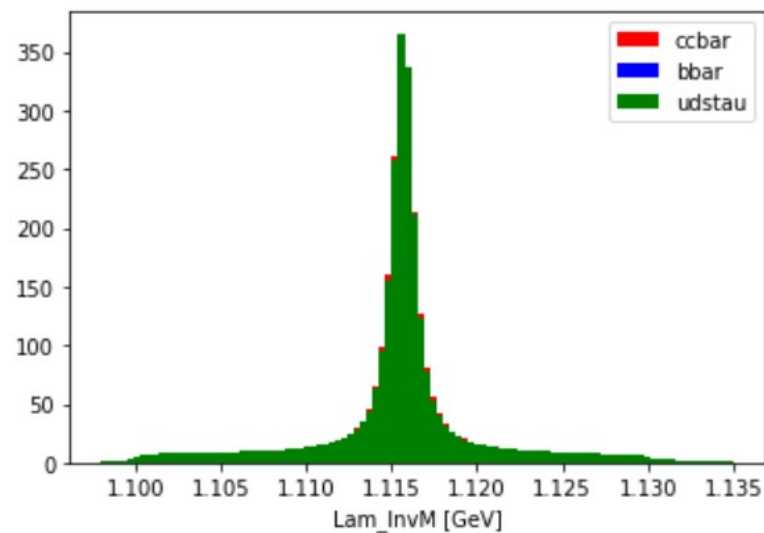
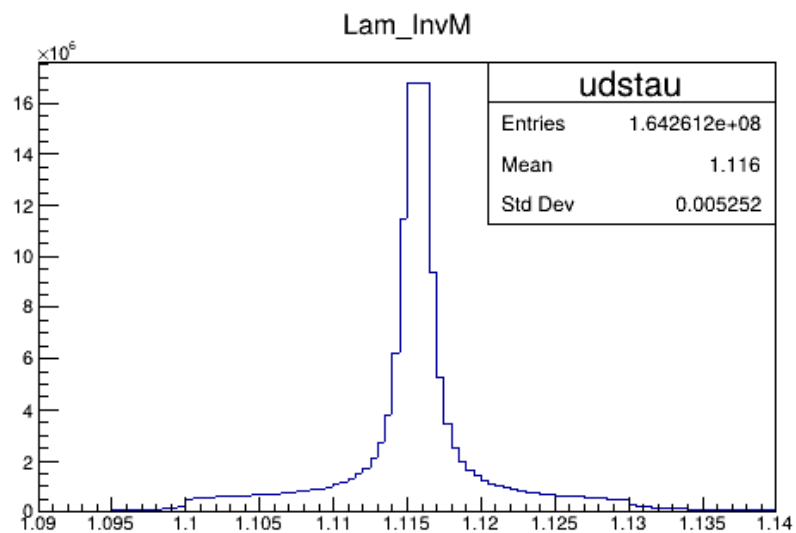
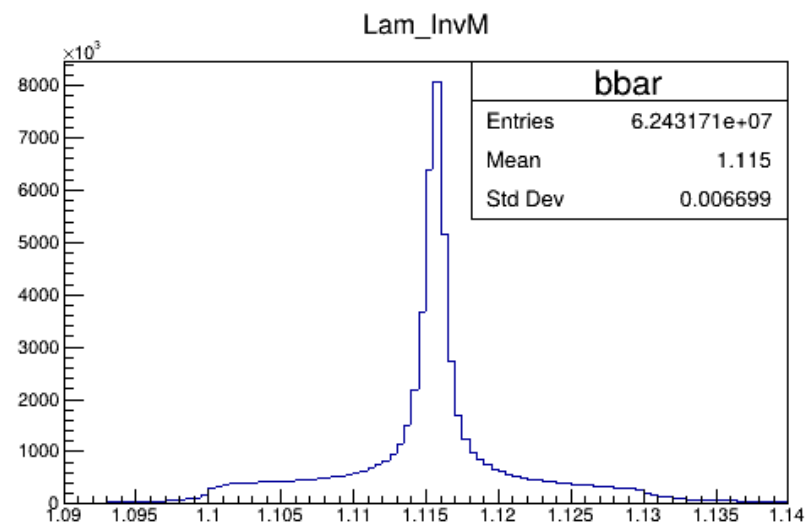
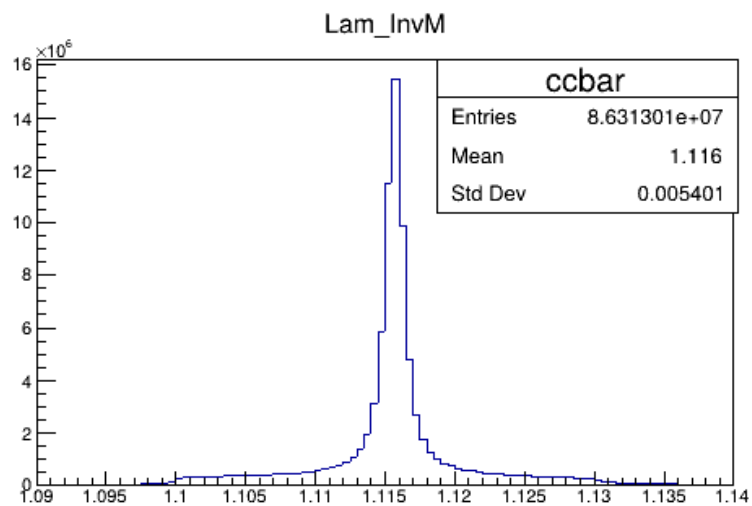
1. /belle/collection/MC/S16_MC16rd-prompt_4S_ccbar_skim_75000100_v1
2. /belle/collection/MC/S16_MC16rd-prompt_4S_udstau_skim_75000100_v1
3. /belle/collection/MC/S16_MC16rd-prompt_4S_BB_skim_75000100_v1
4. /belle/collection/MC/S16_MC16rd-proc16_4S_ccbar_skim_75000100_v2
5. /belle/collection/MC/S16_MC16rd-proc16_4S_udstau_skim_75000100_v2
6. /belle/collection/MC/S16_MC16rd-proc16_4S_BB_skim_75000100_v2

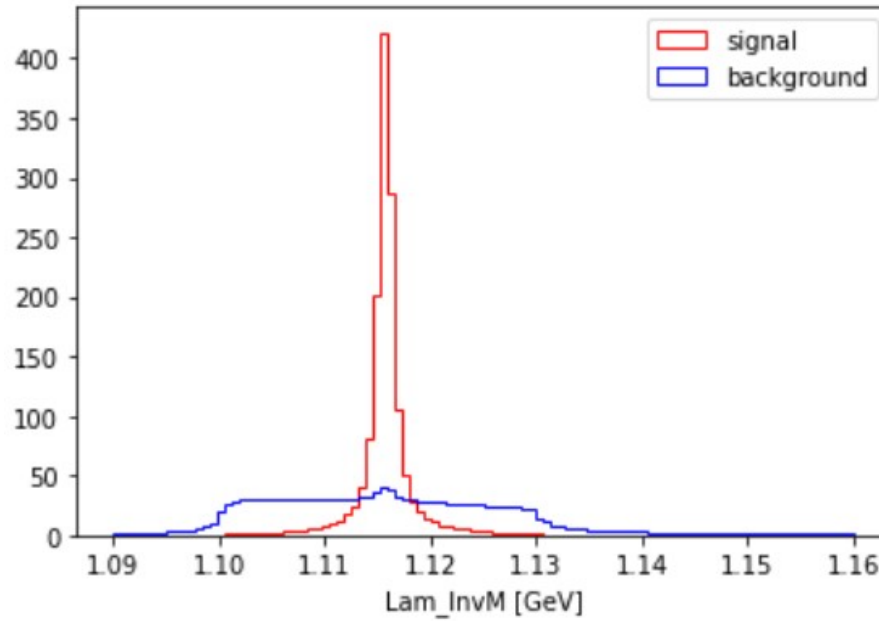
7. /belle/collection/Data/S16_prompt_4S_skim_75000100_v1
8. /belle/collection/Data/S16_proc16_4S_skim_75000100_v2

```
def Lambda0_skim(output_list="Lambda0:skimoff", input_list="Lambda0:merged", path=None):
    skimCuts = "cosAlpha > 0.99"
    skimCuts += " and 0.6 < momRatio_protonLambda < 1."
    skimCuts += " and flightSignificance > 3."
    skimCuts += " and protonID_proton > 0.1"
    ma.cutAndCopyList(output_list, input_list, cut=skimCuts, path=main)

ma.applyEventCuts('eventExtraInfo(passes_InclusiveLambda)==1', path=main)
stdLambdas(prioritiseV0=True, fitter='TreeFit', path=main)
Lambda0_skim(output_list="Lambda0:cut", path=main)
if args.isMC :
    ma.matchMCTruth(list_name='Lambda0:cut', path=main)
```

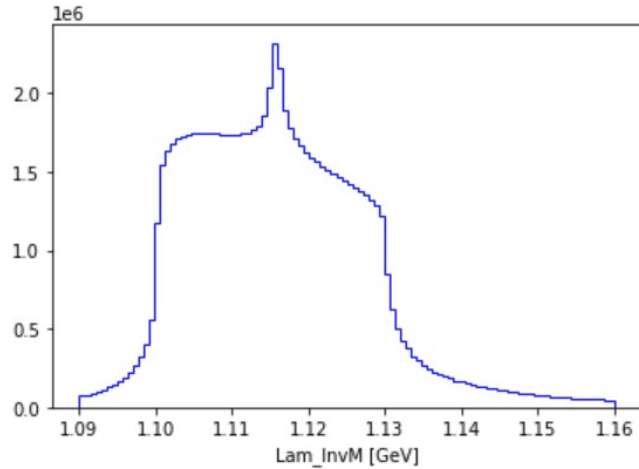






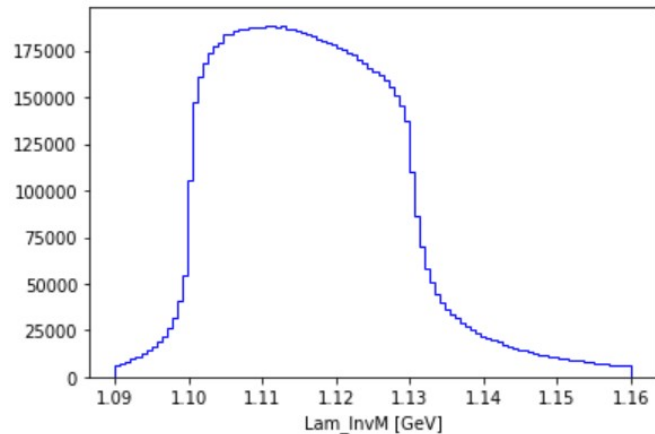
Signal = 229056993
Background = 83948957

Lam_isSignal != 1

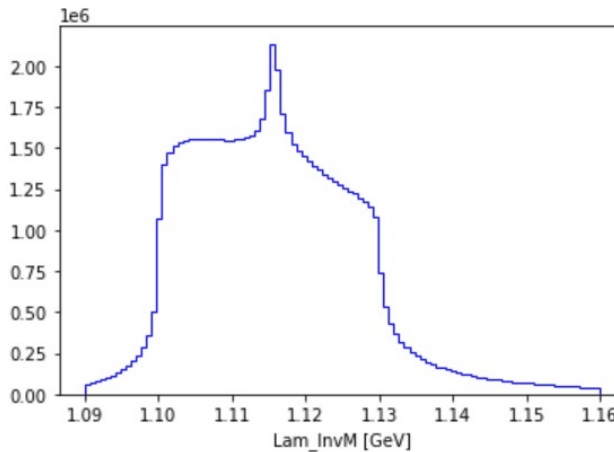


```
root [2] LamPPi->Scan("Lam_mcPDG:p_mcPDG:pi_mcPDG","Lam_isSignal!=1")
*****
*   Row   * Lam_mcPDG *   p_mcPDG *   pi_mcPDG *
*****
*     0   *   300553 *     321   *    -211   *
*     1   *     521   *     321   *    -211   *
*     3   *     521   *    -2212  *     13   *
*     4   *   300553 *     2212  *     211   *
*     7   *    -521   *    -321   *    -211   *
*    12   *   300553 *    -2212  *     211   *
*    13   *   300553 *    -2212  *     211   *
*    14   *    -11   *    -11   *    -11   *
*    15   *    nan   *    -2212  *    nan   *
*    17   *     22   *     11   *    -11   *
*    21   *    -521   *     2212  *    -211   *
*    22   *    nan   *    nan   *    nan   *
*    24   *   300553 *    -2212  *     2212  *
*    26   *    nan   *    -2212  *    nan   *
*    29   *   300553 *     2212  *     11   *
*    34   *   300553 *     2212  *     13   *
*    35   *   300553 *     2212  *    -211   *
*    37   *   300553 *     2212  *     13   *
*    38   *     130   *     2212  *     211   *
*    44   *    -521   *     2212  *    -211   *
*    48   *    nan   *    -2212  *    nan   *
*    55   *    nan   *     2212  *    nan   *
*    56   *    nan   *    nan   *    nan   *
*    58   *   300553 *    -2212  *     211   *
*    66   *   300553 *     211   *    -211   *
```

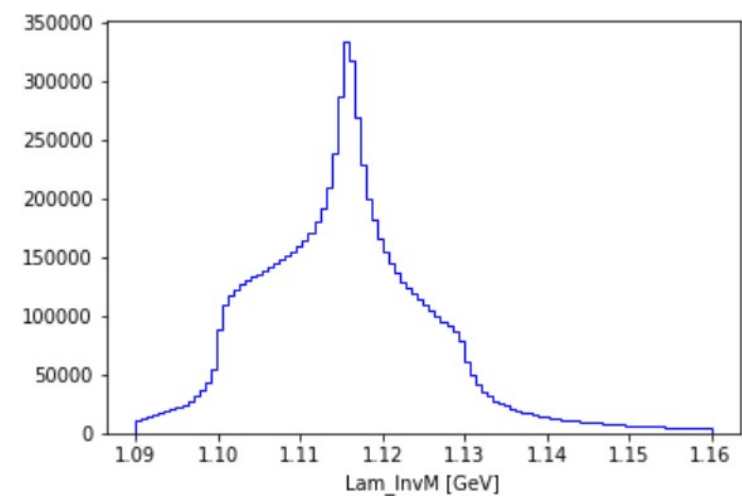
Lam_mcPDG = 300553



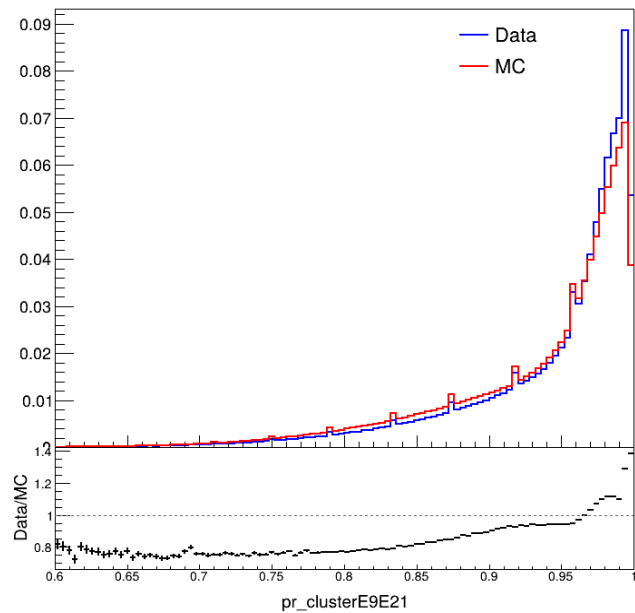
Lam_mcPDG != 300553



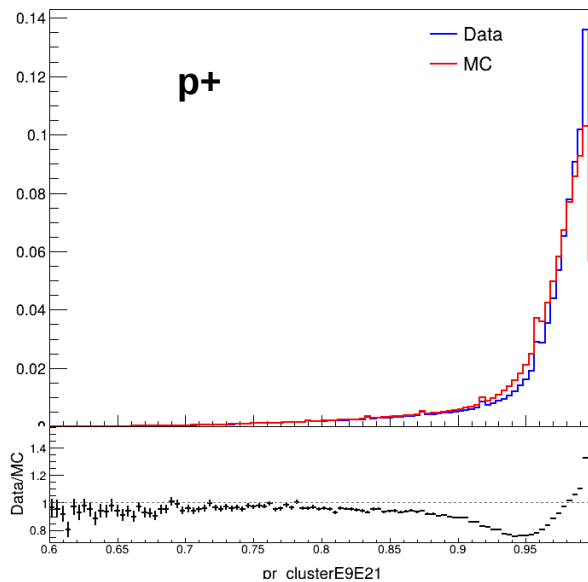
$(\text{Lam_mcPDG} \neq \text{Lam_mcPDG}) \ \& \ (\text{abs}(p_mcPDG) = 2212 \ || \ \text{abs}(pi_mcPDG) = 211)$



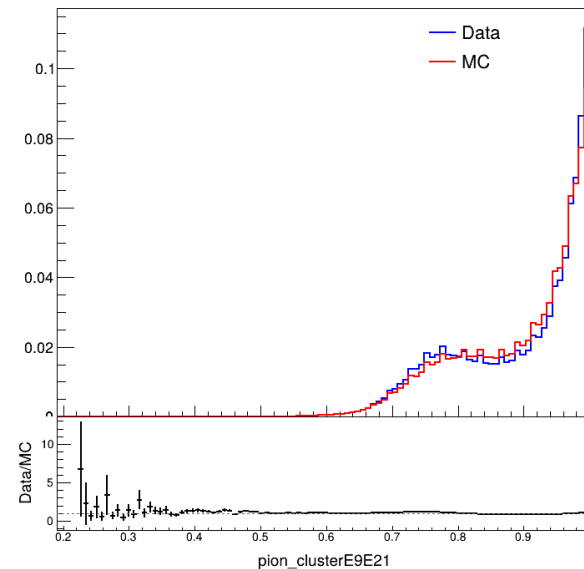
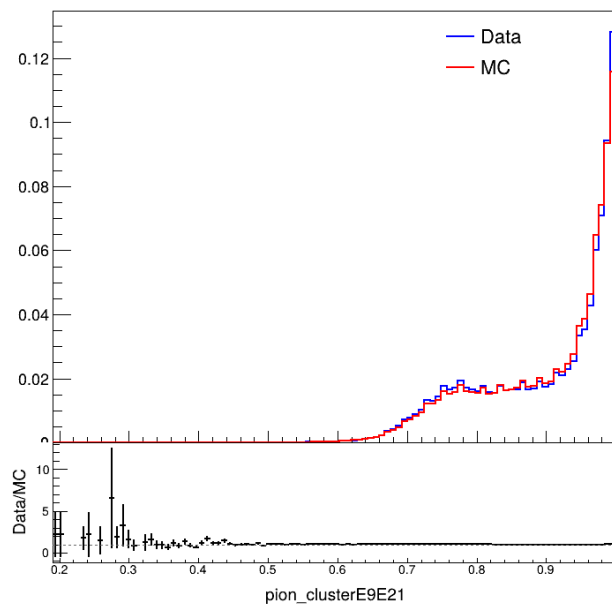
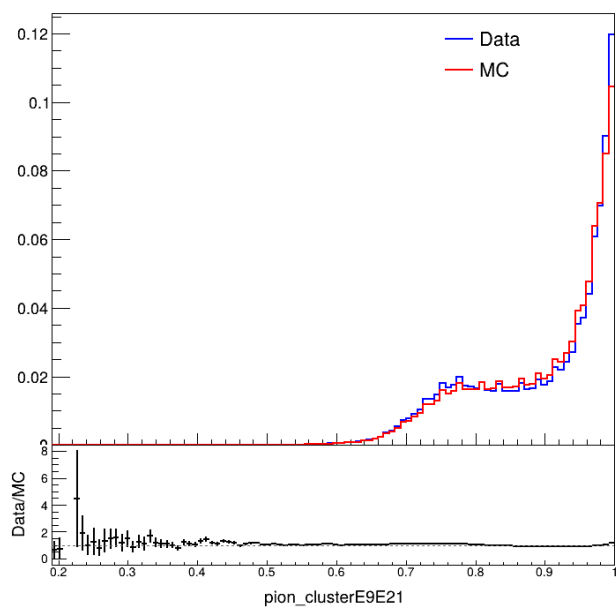
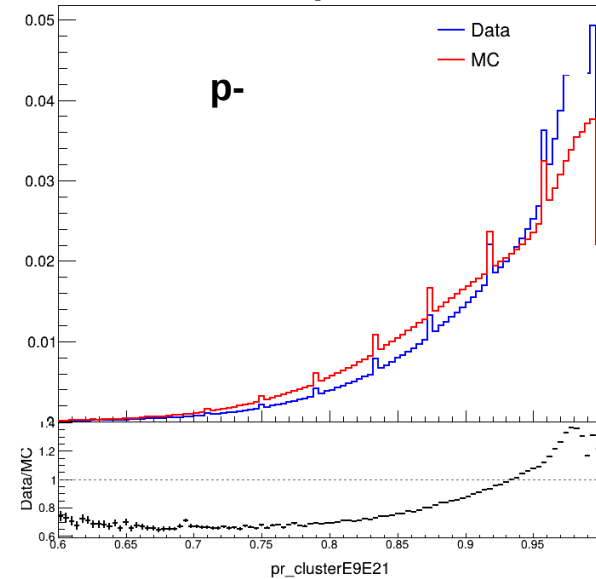
Total

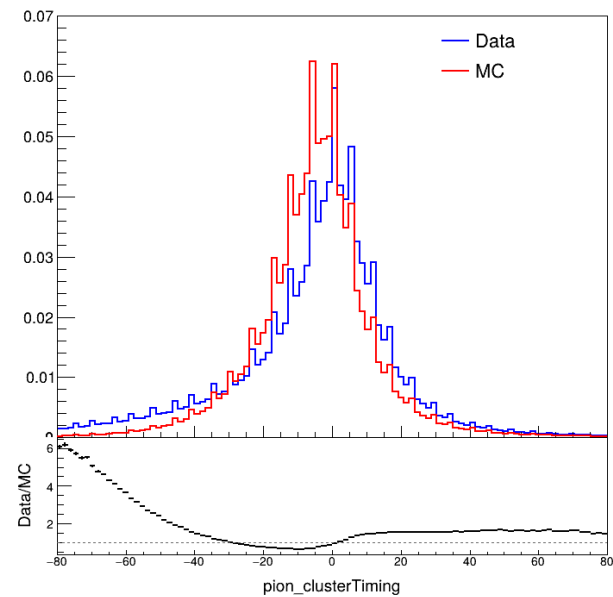
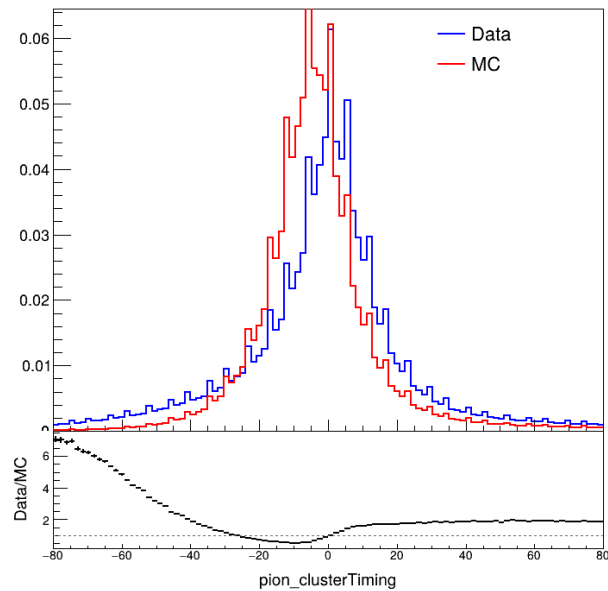
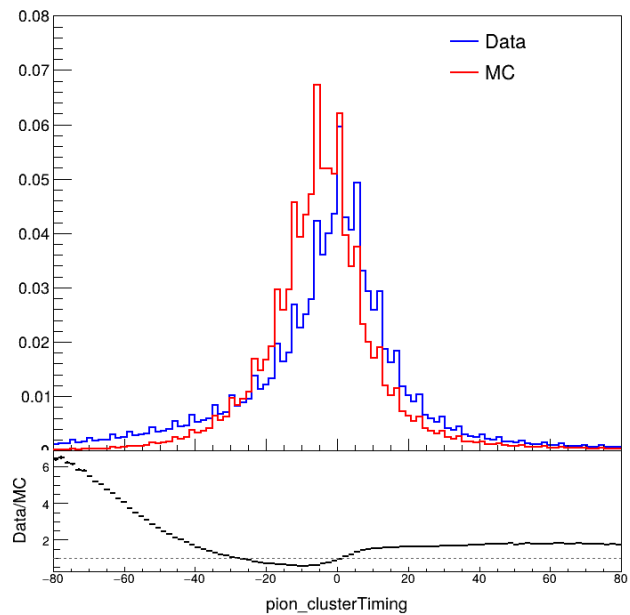
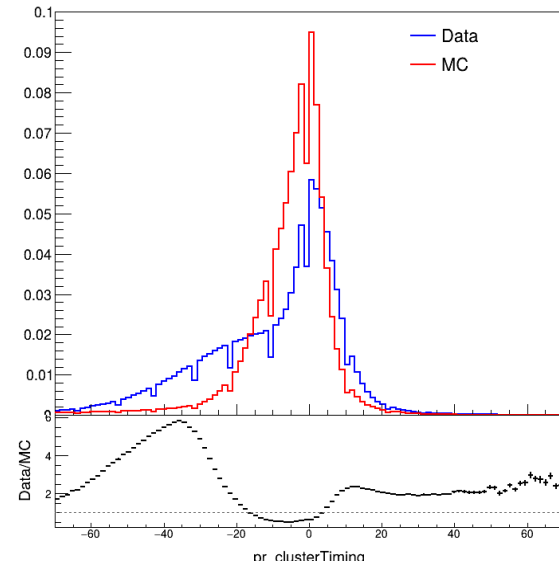
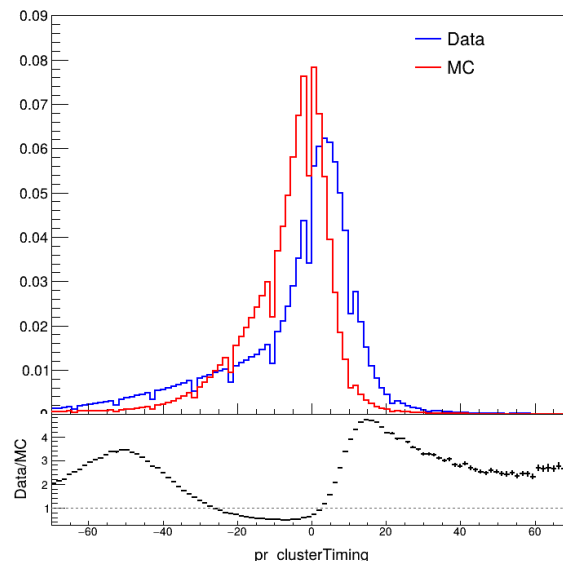
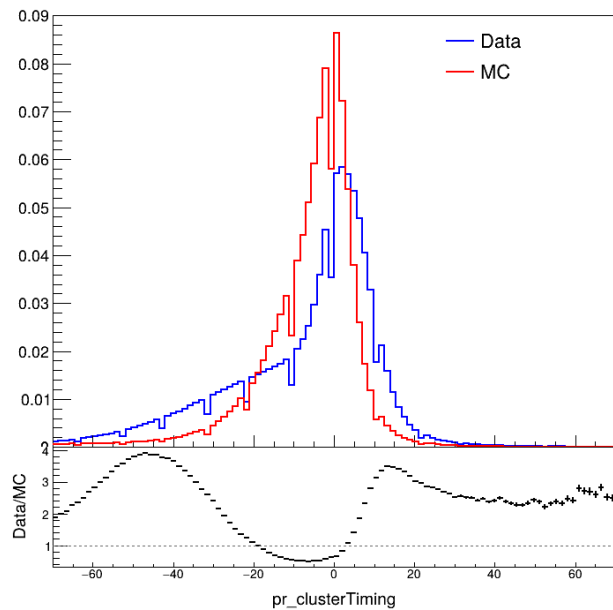


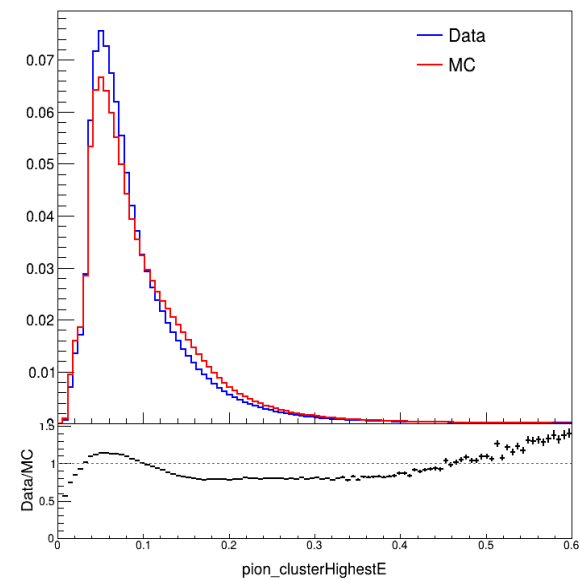
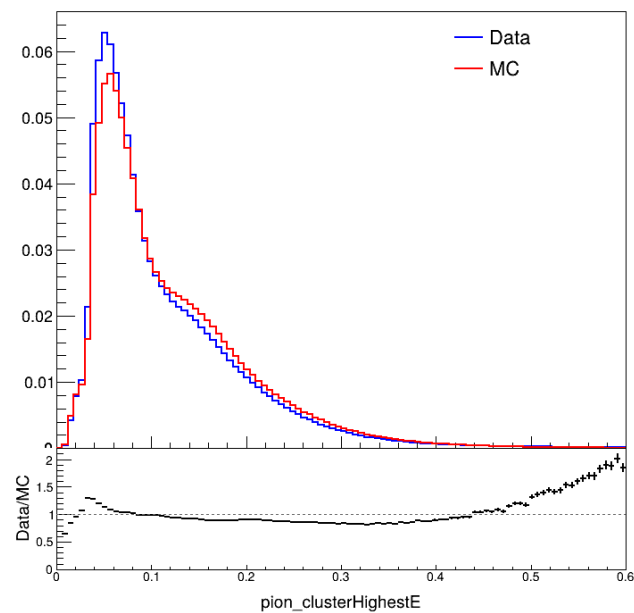
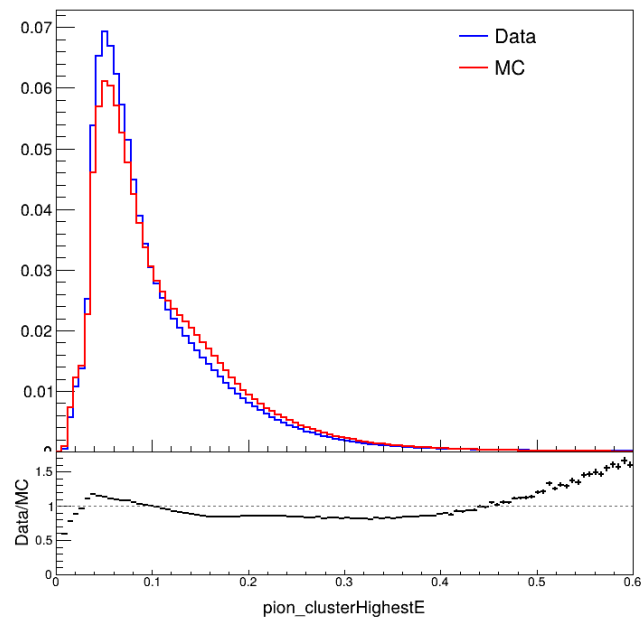
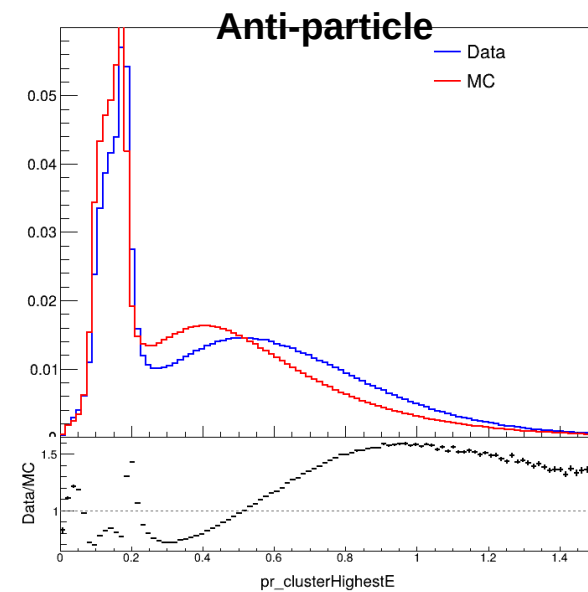
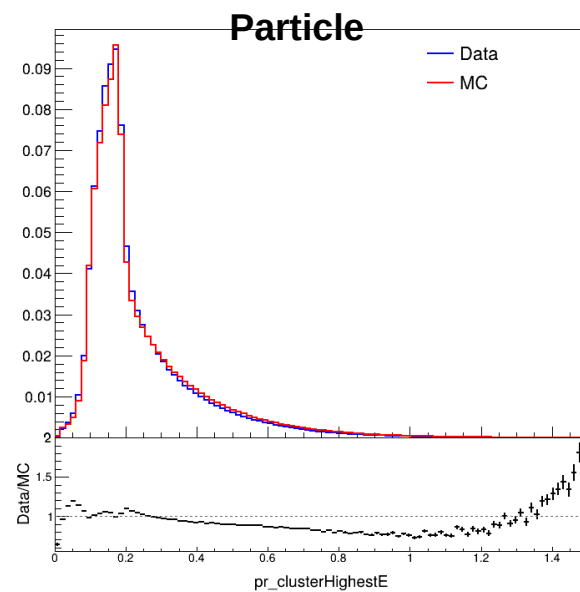
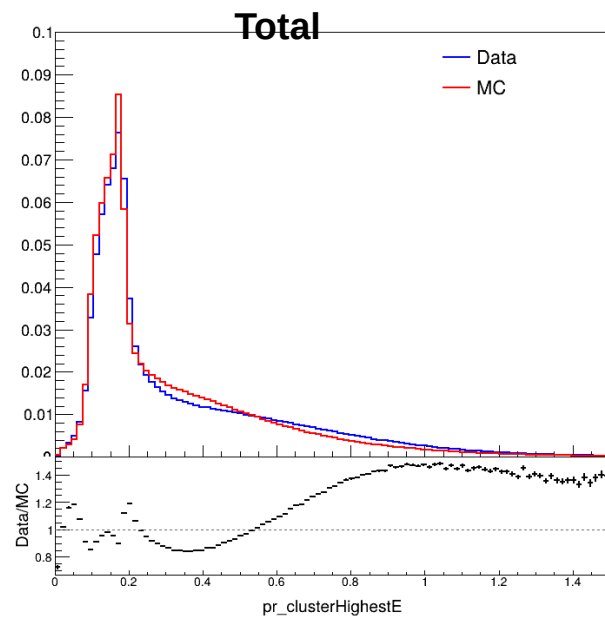
Particle

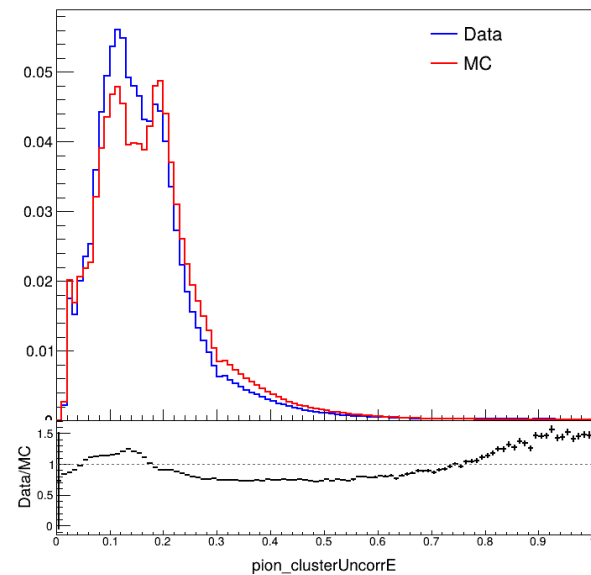
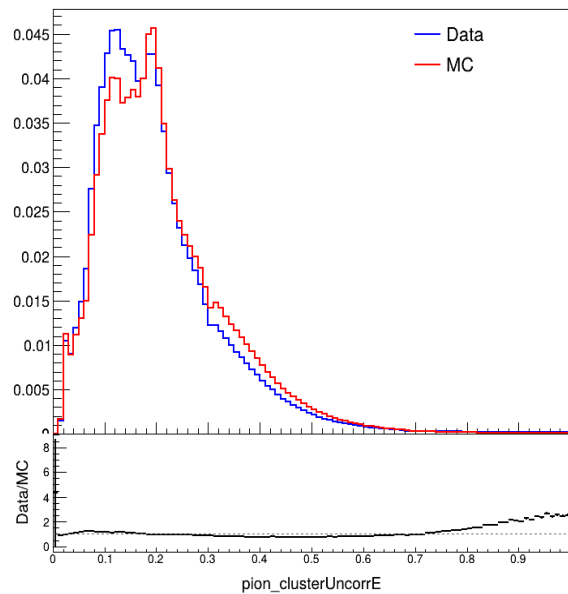
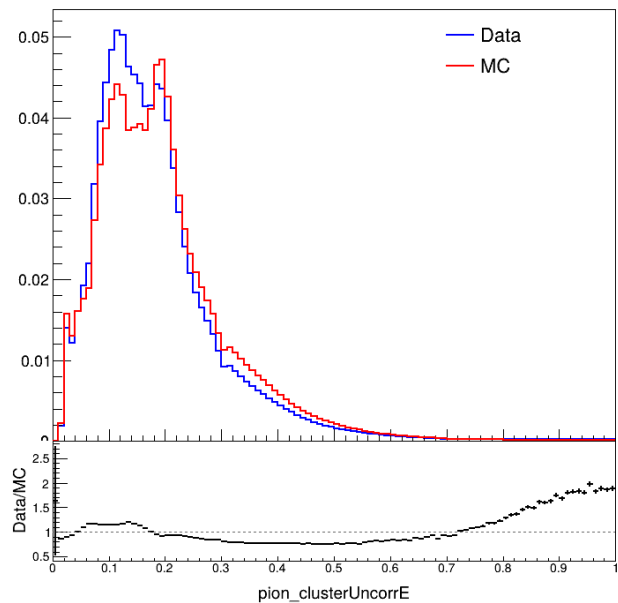
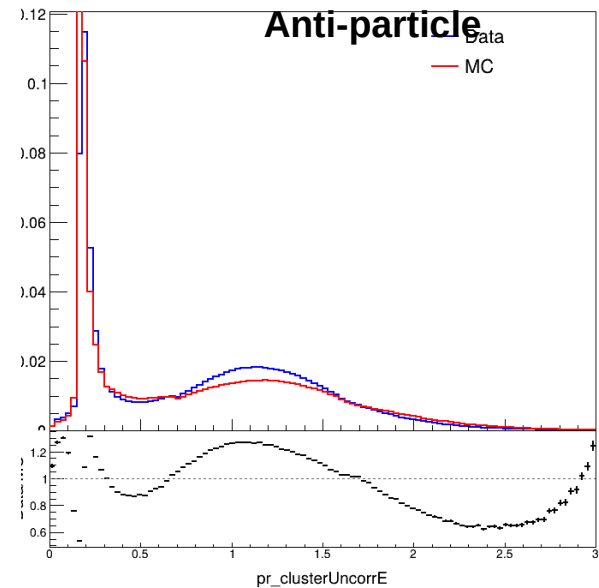
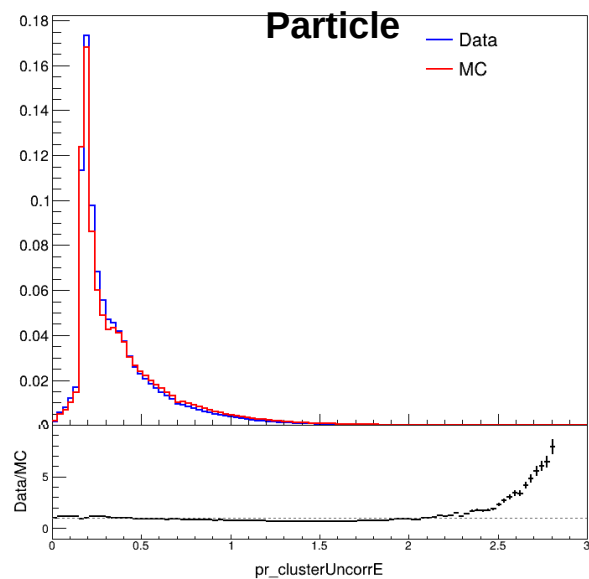
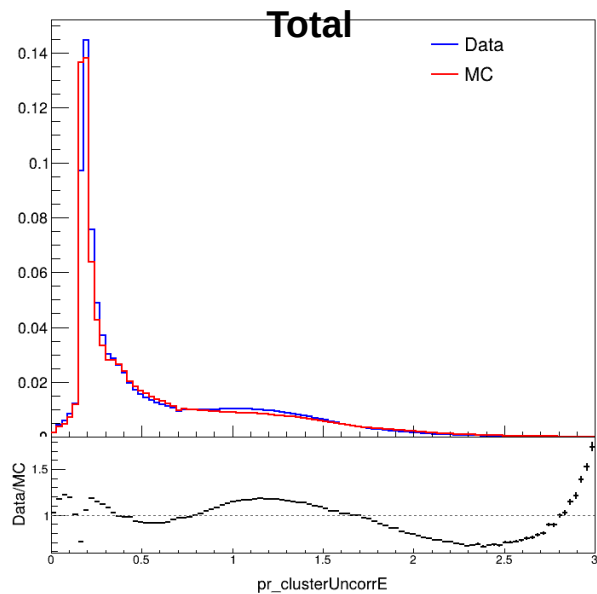


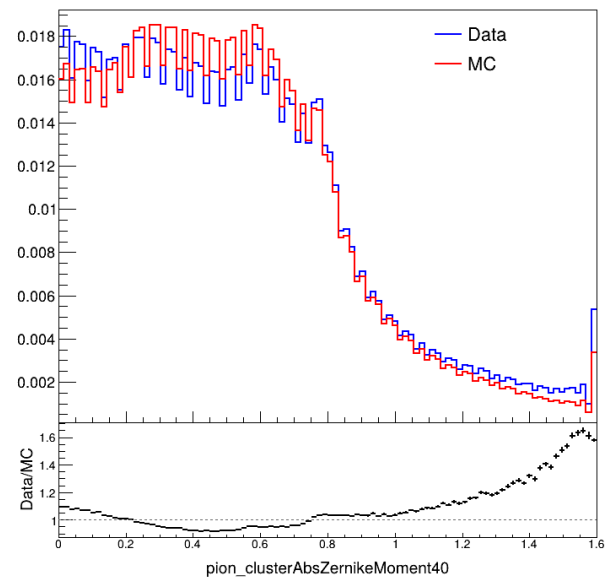
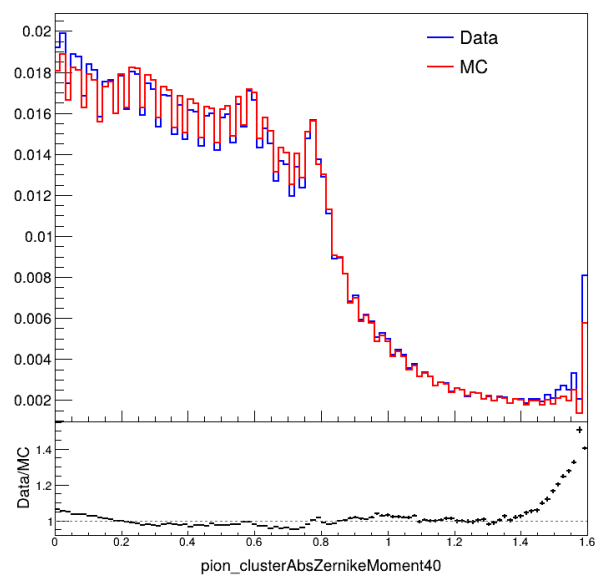
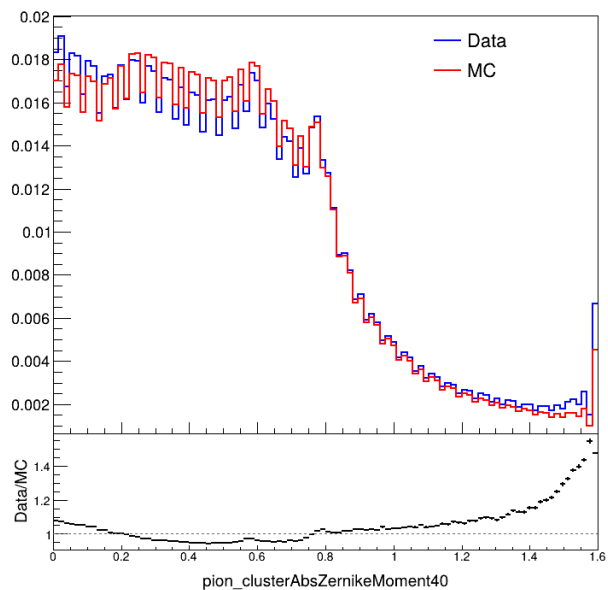
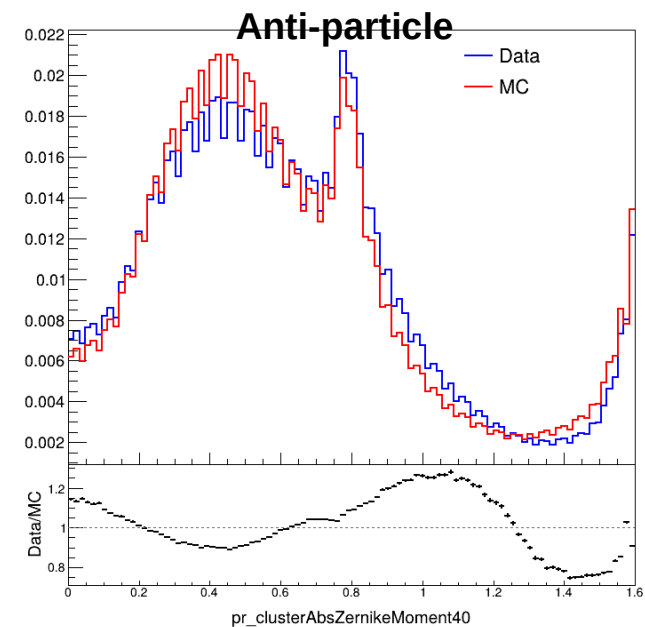
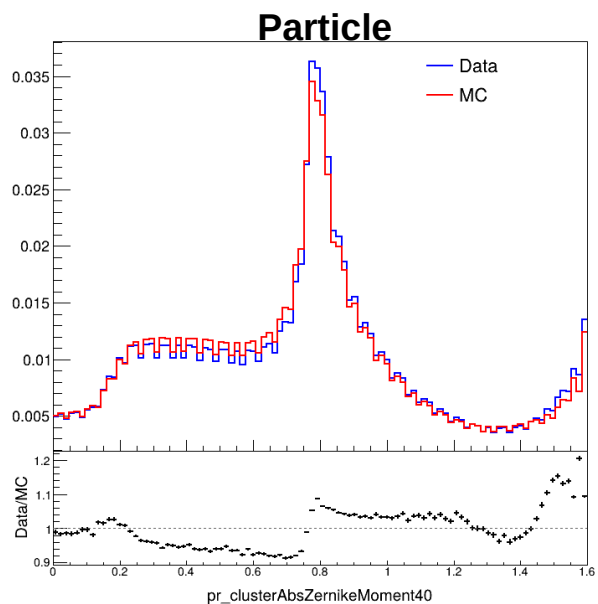
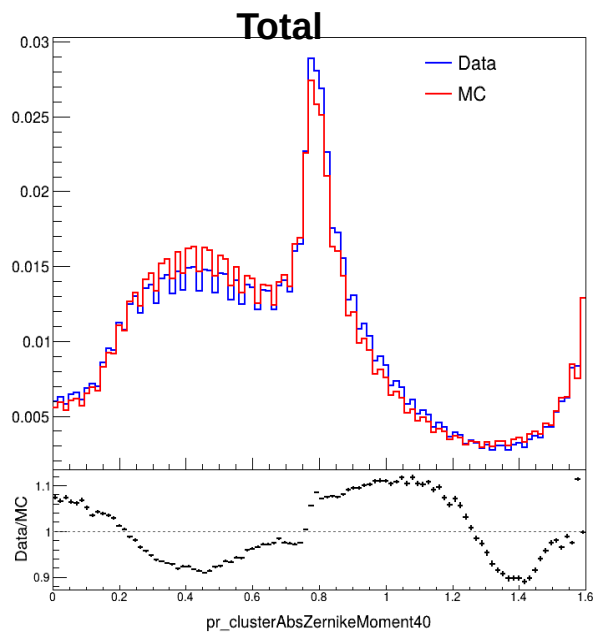
Anti-particle

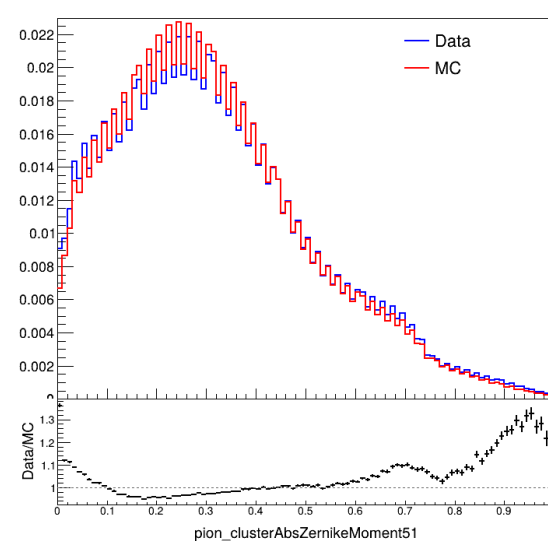
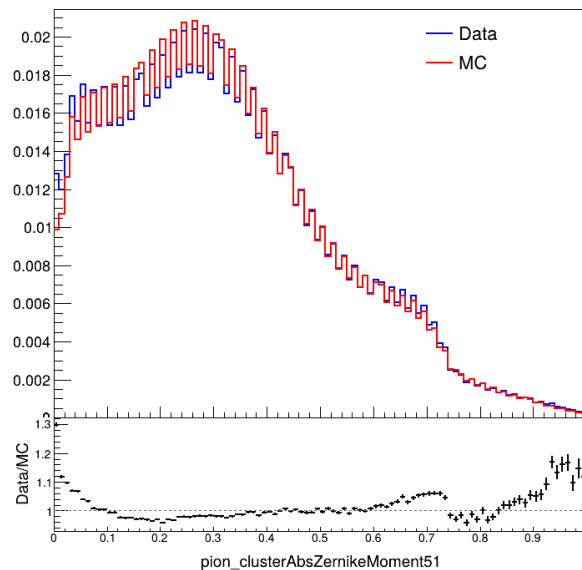
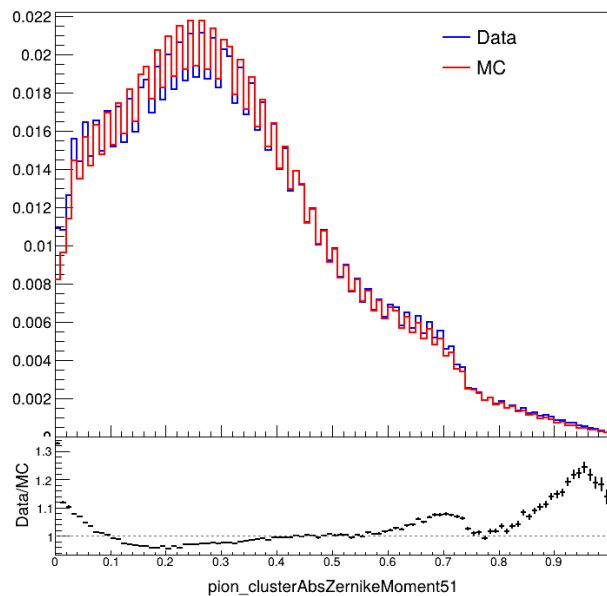
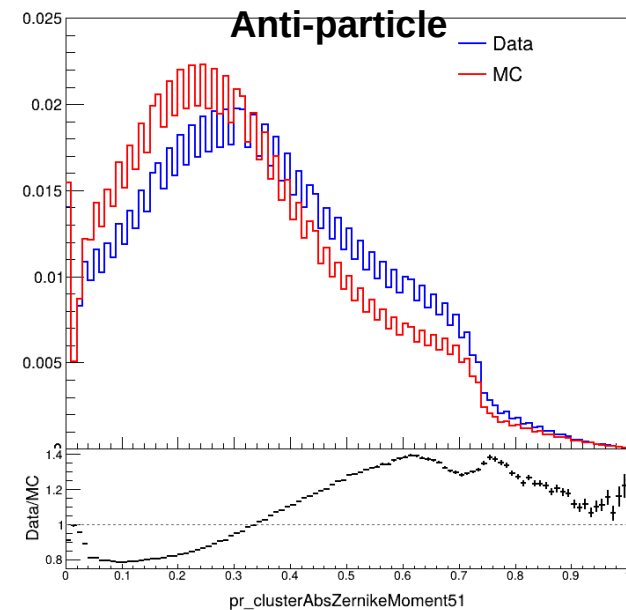
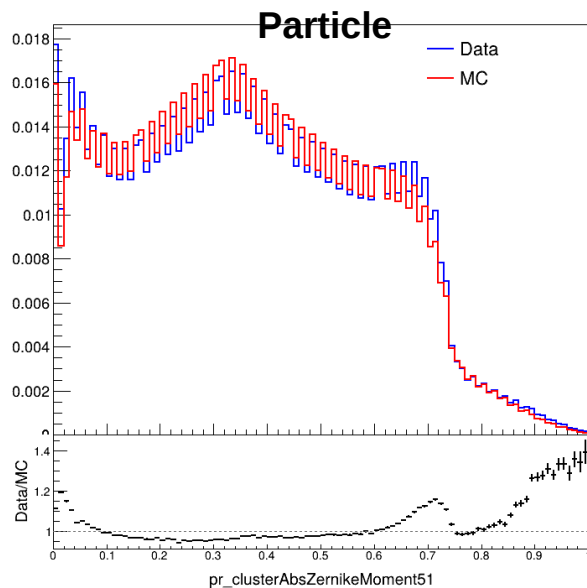
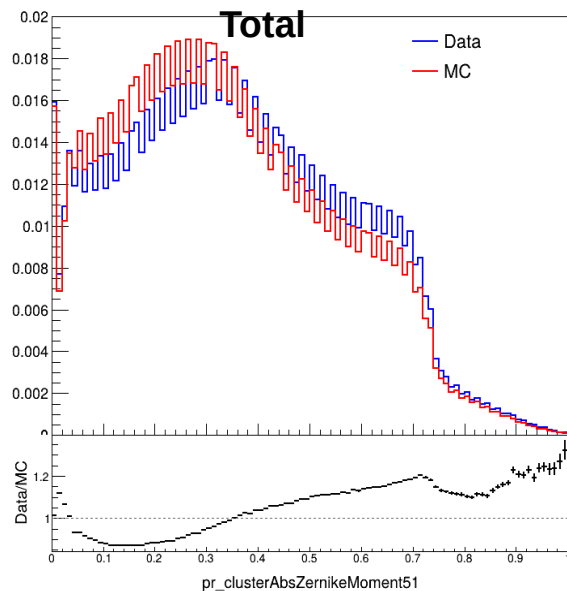


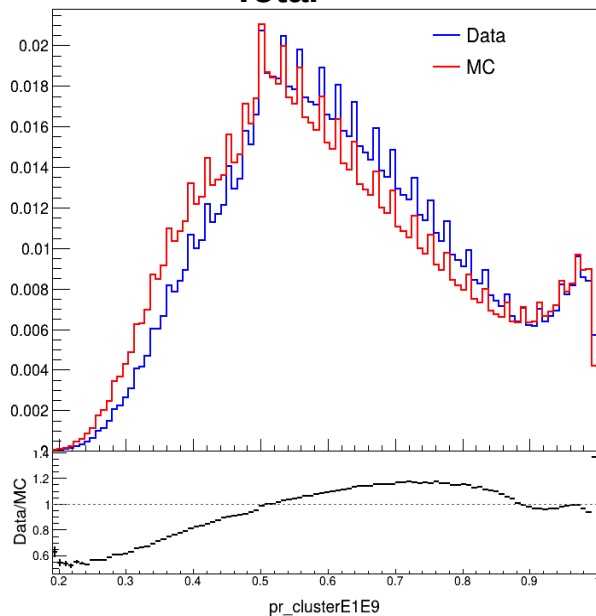
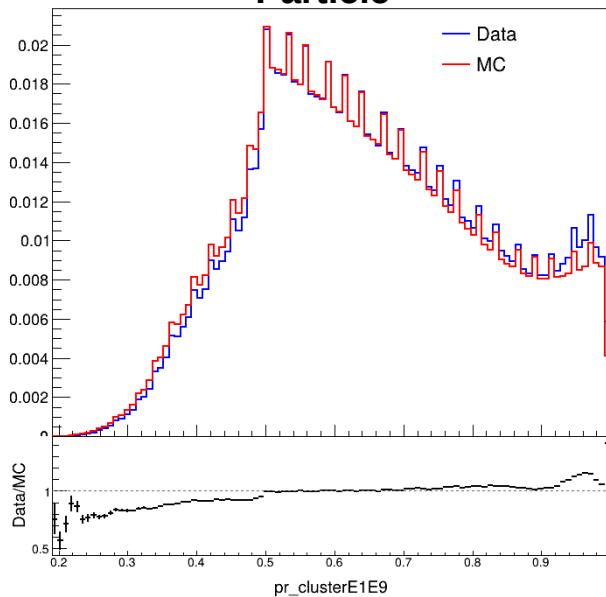
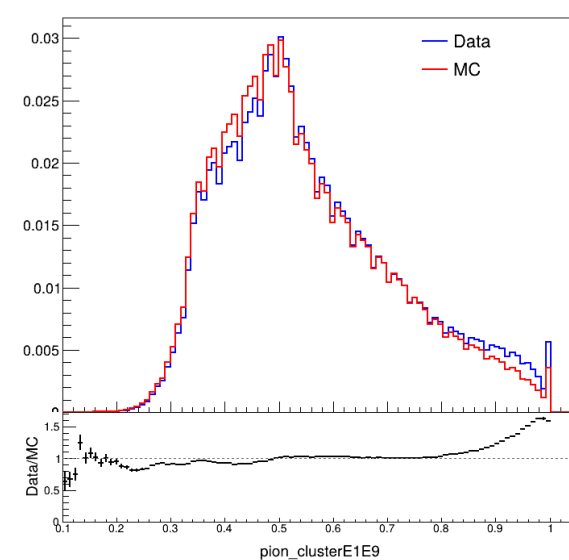
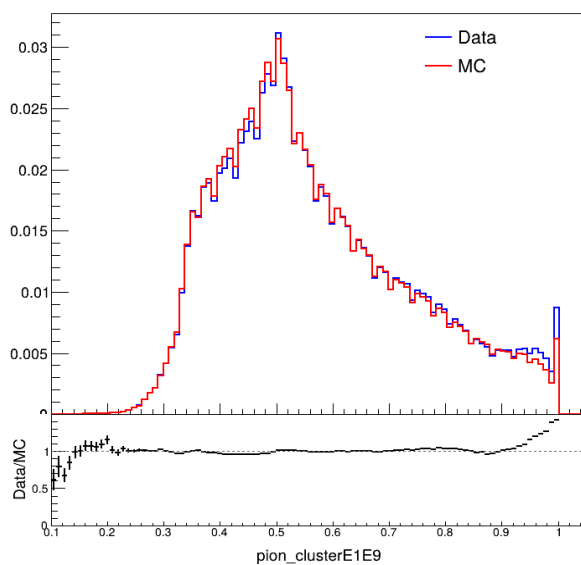
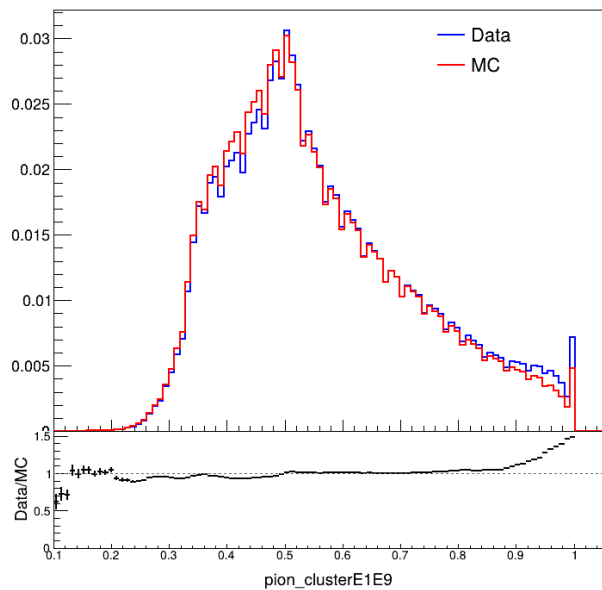
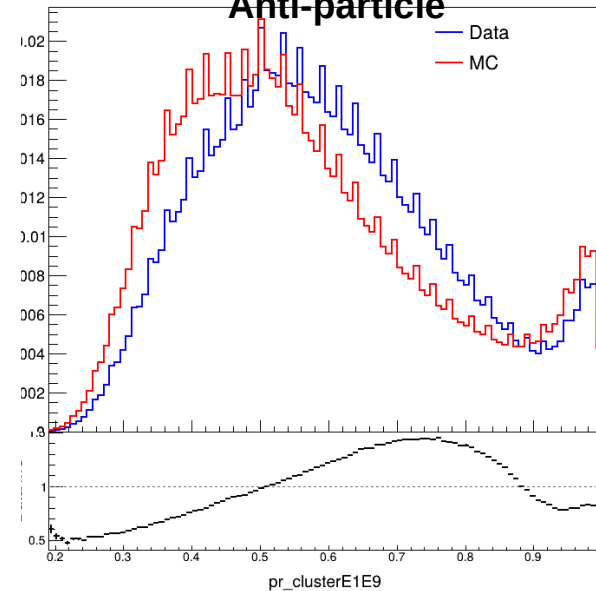


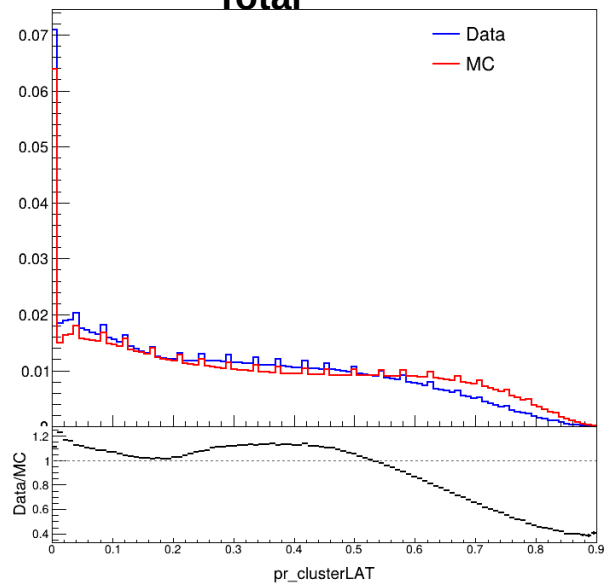
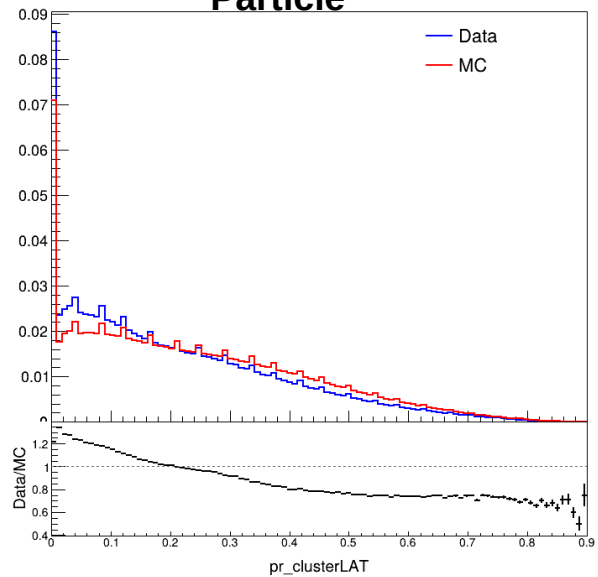
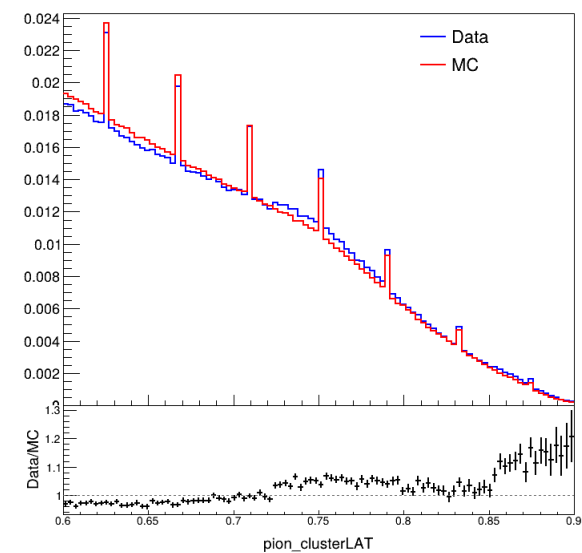
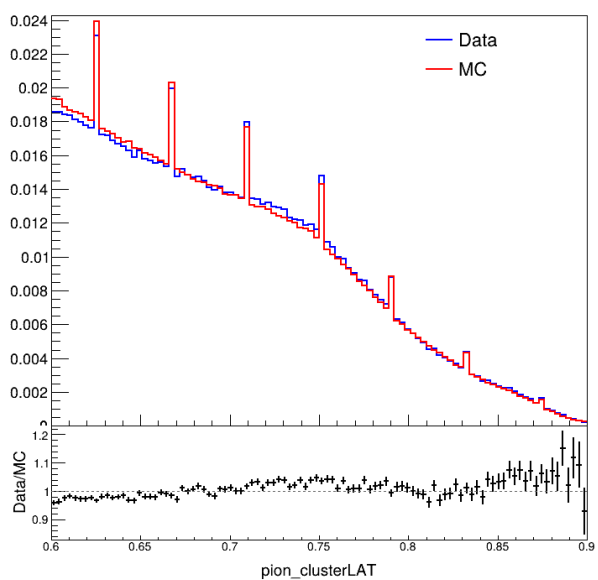
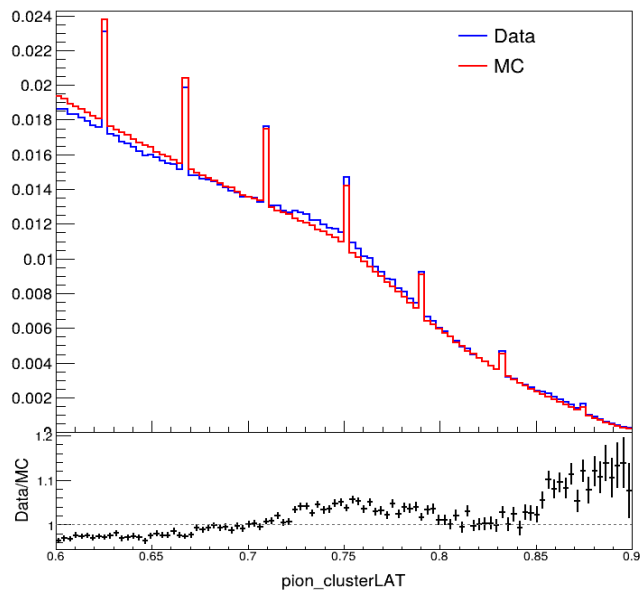
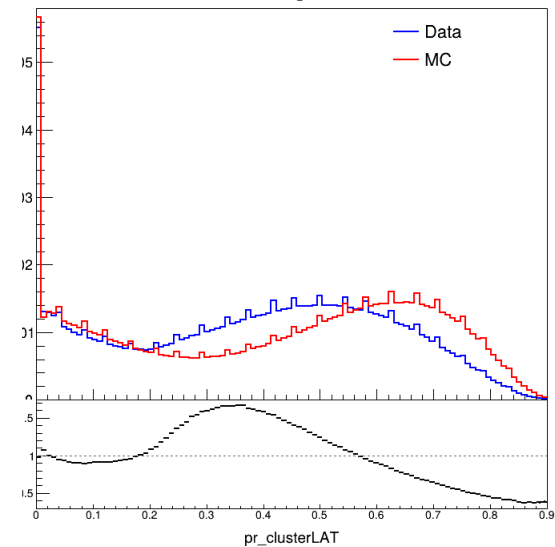


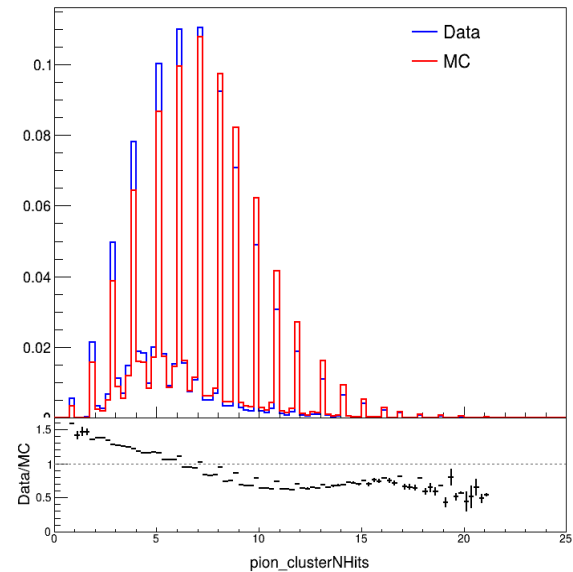
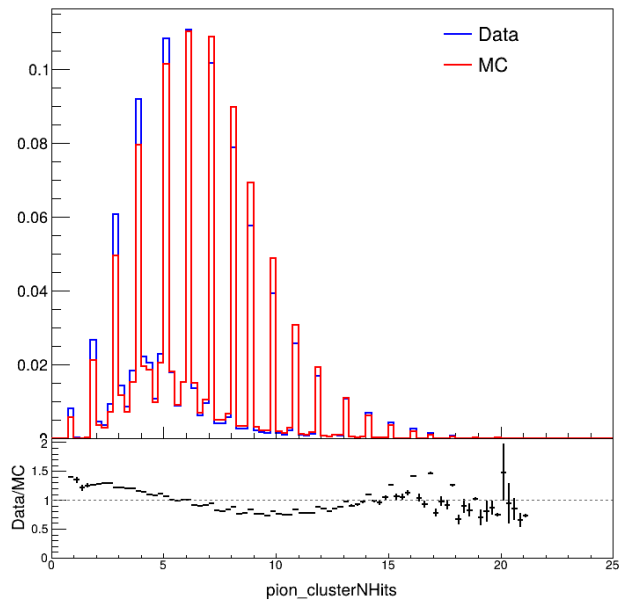
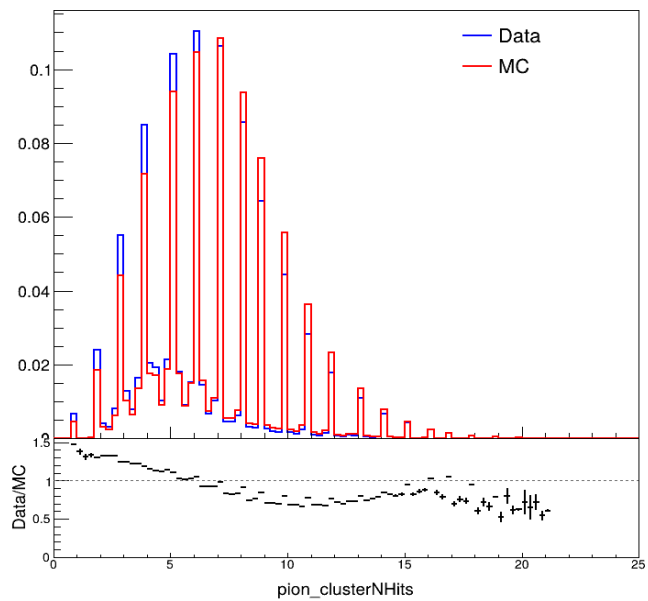
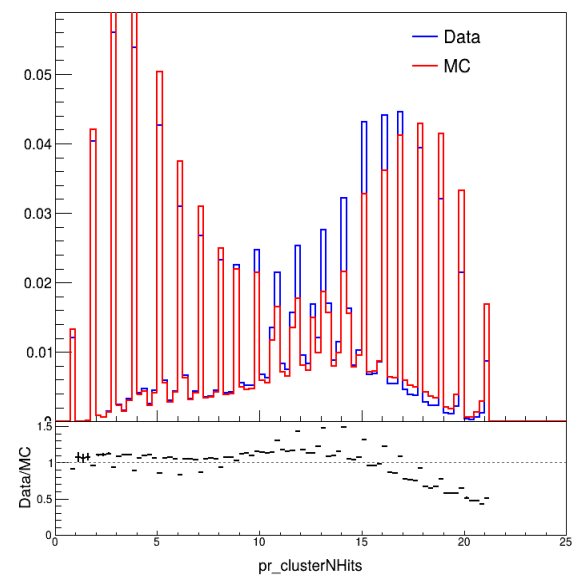
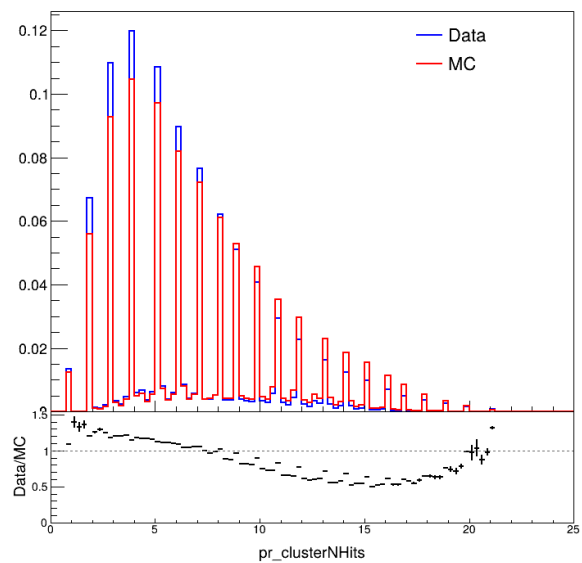
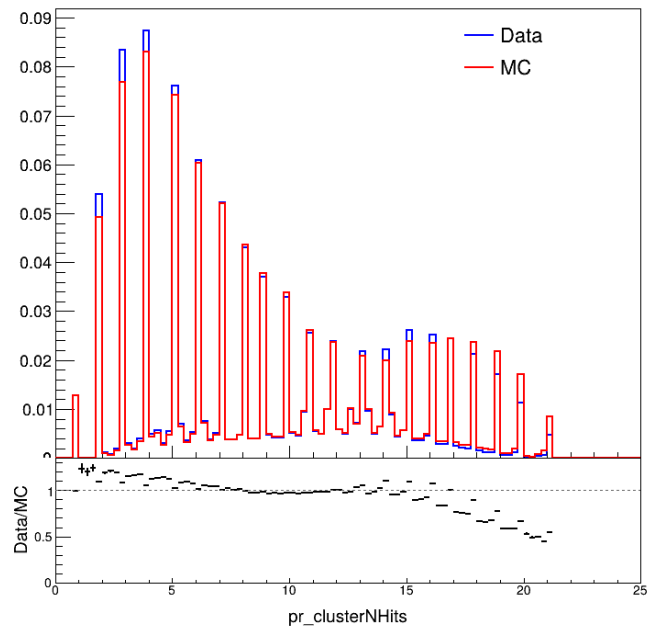


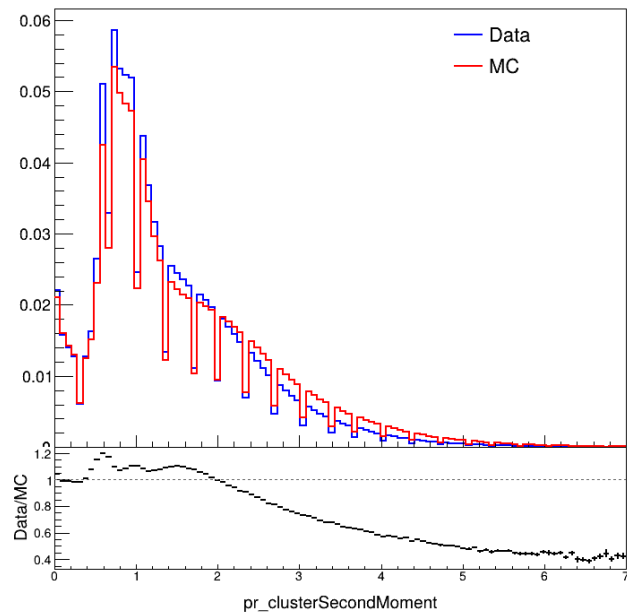
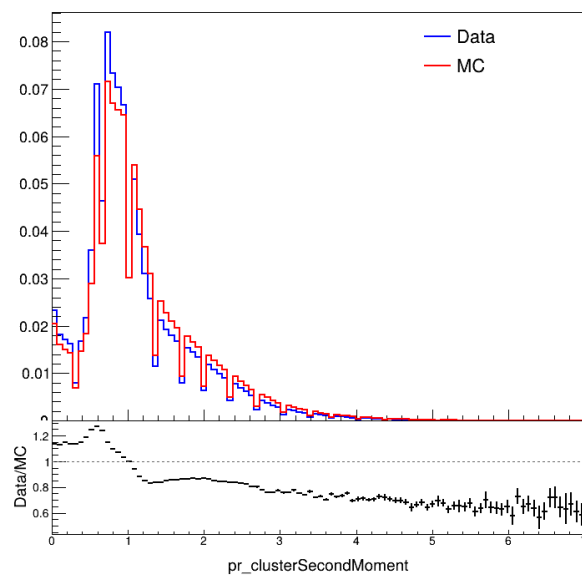
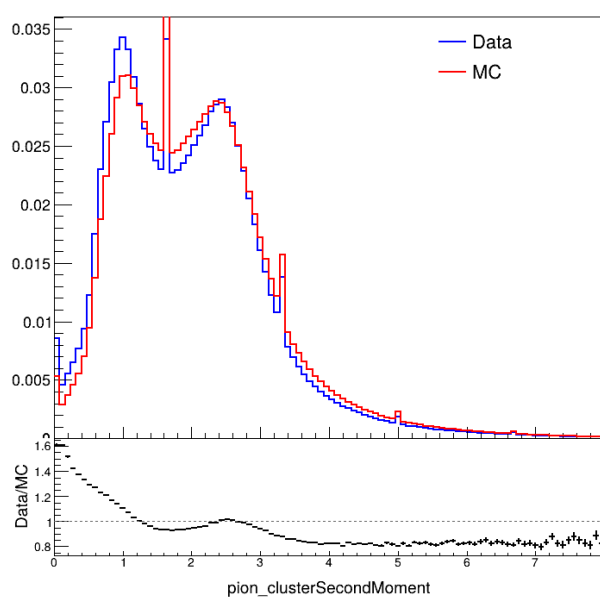
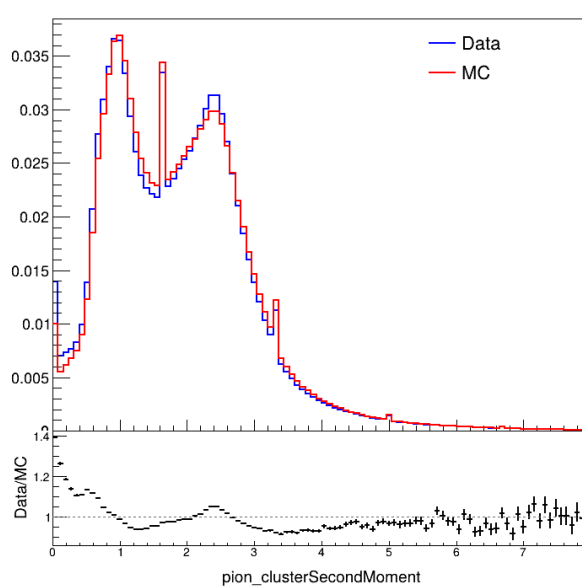
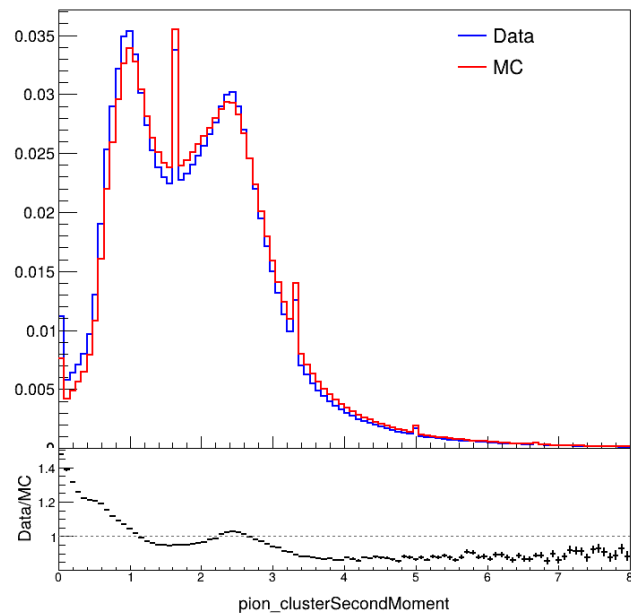
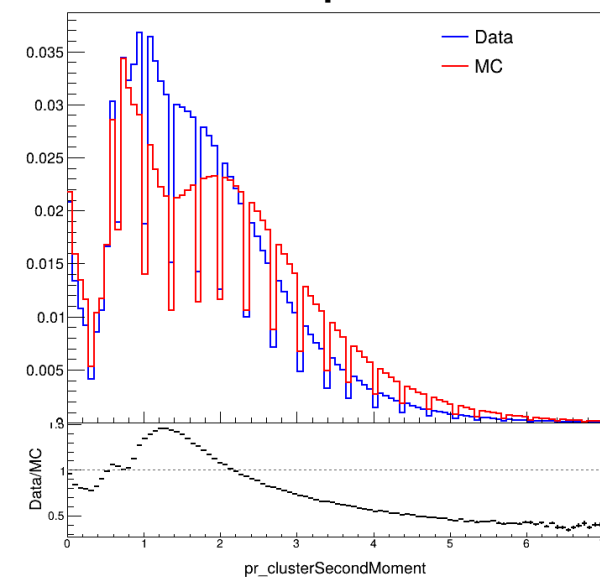


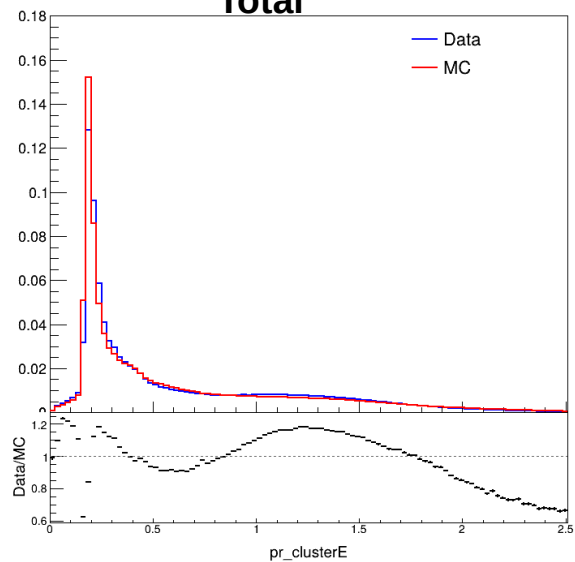
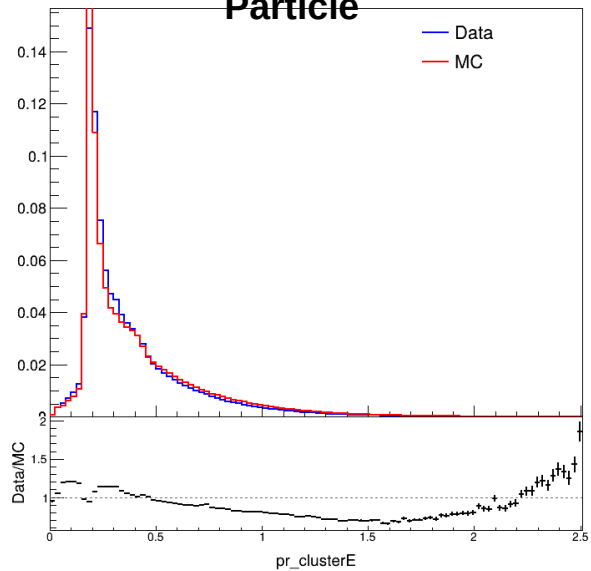
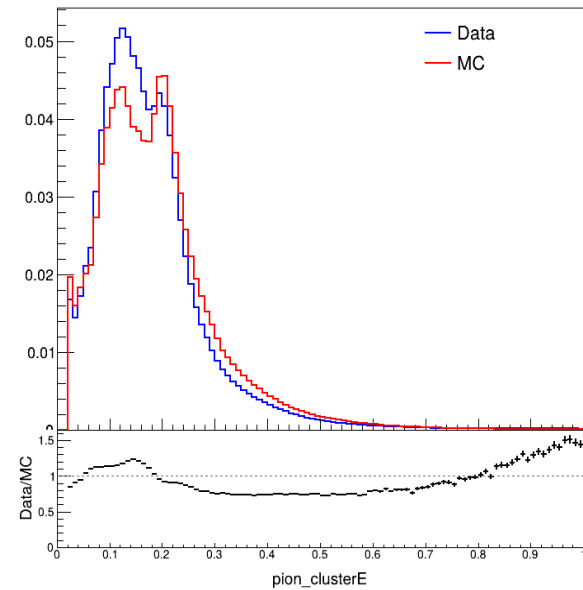
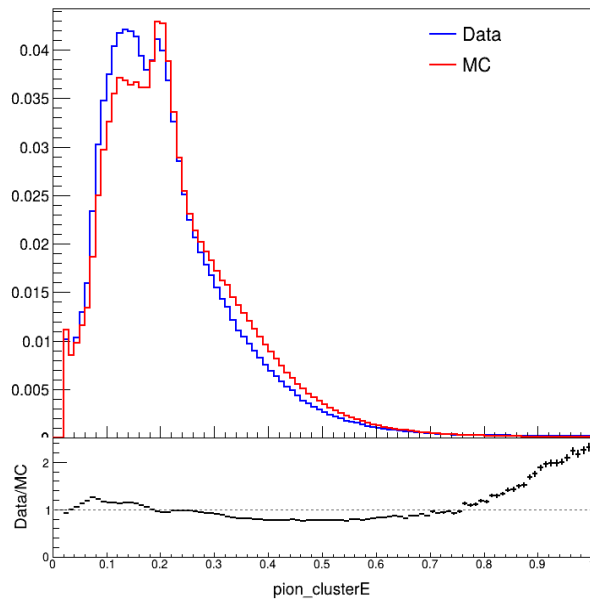
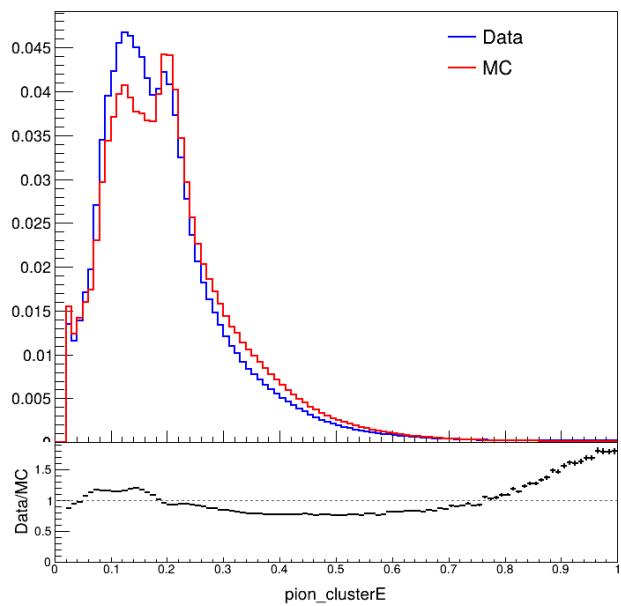
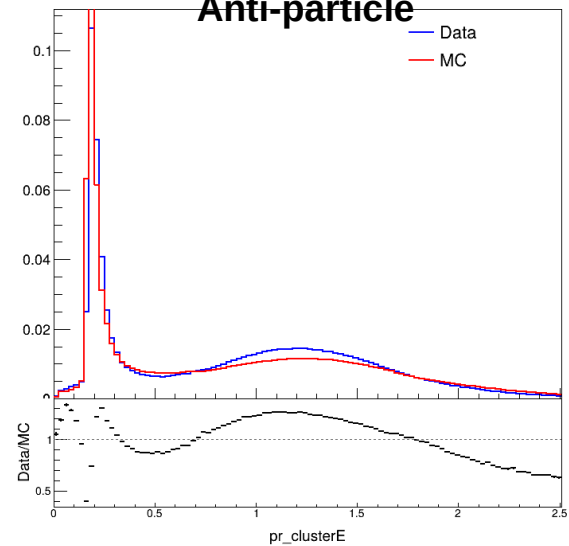


Total**Particle****Anti-particle**

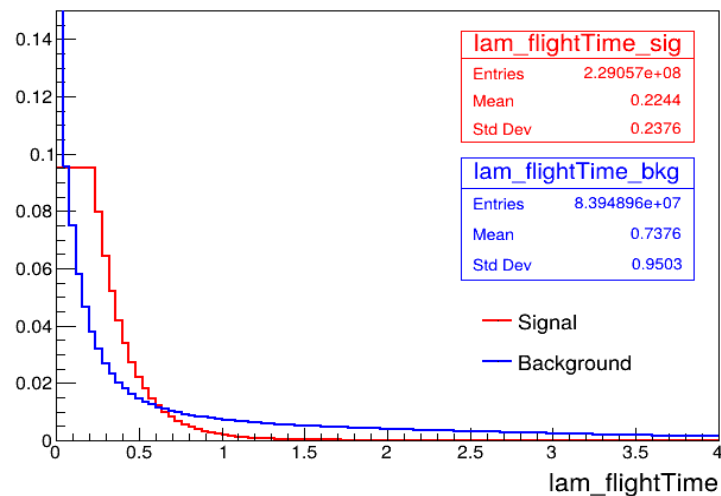
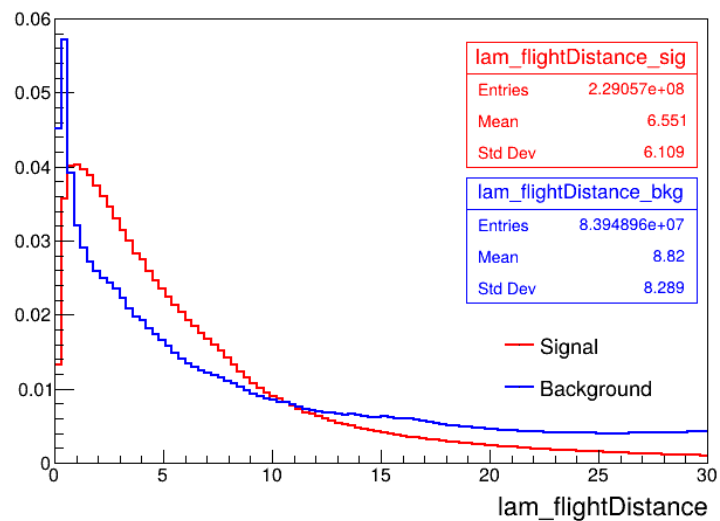
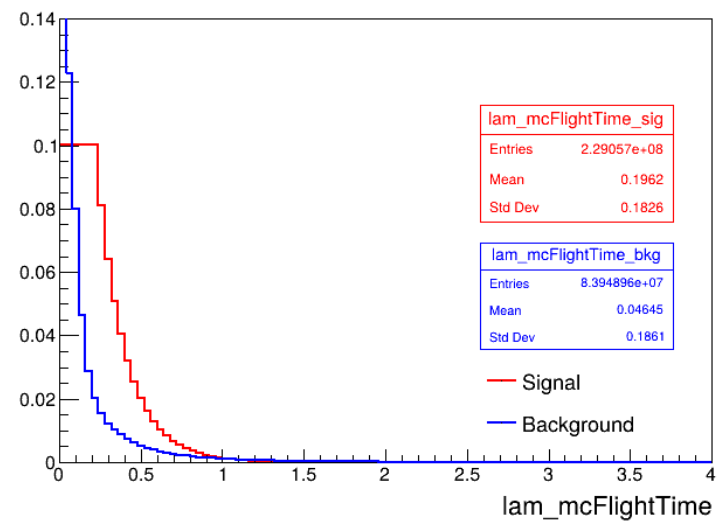
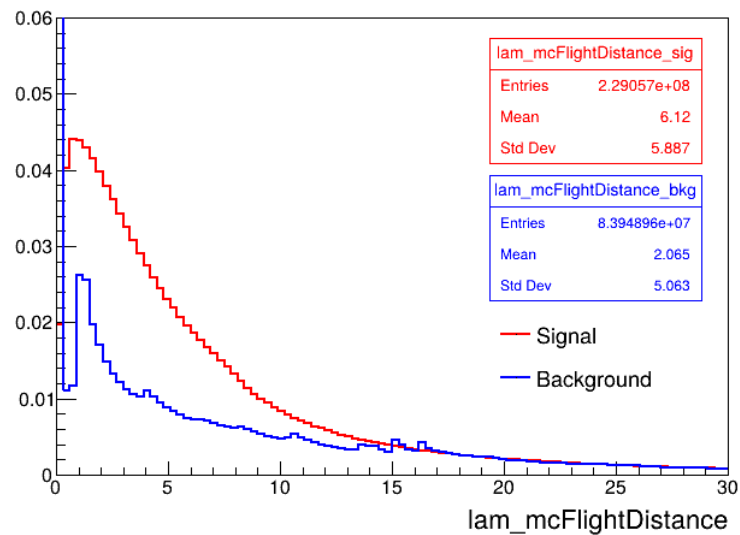
Total**Particle****Anti-particle**



Total**Particle****Anti-particle**

Total**Particle****Anti-particle**

Backup Slides



Lam_isSignal==1

Lam_isSignal!=1

