

Toy with LHCb results

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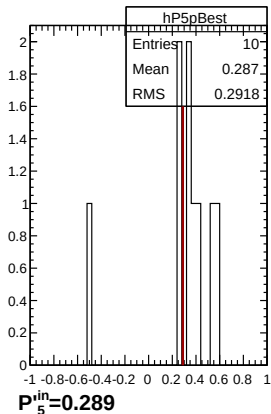
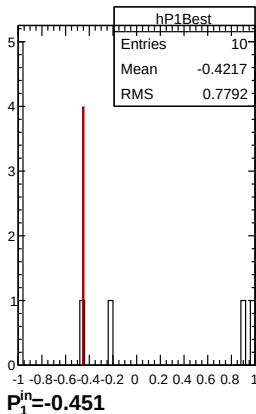
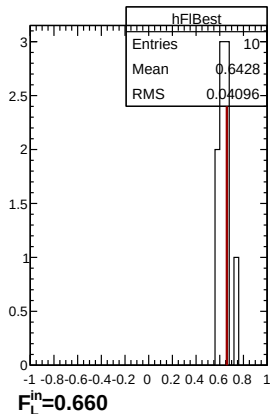
INFN Padova

P5p meeting,
vidyo, 7 July 2016

LHCb-values injection test

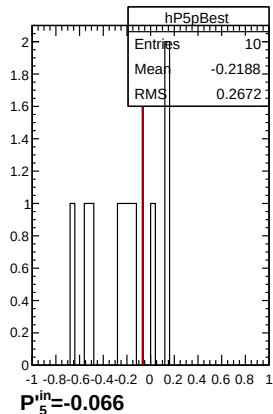
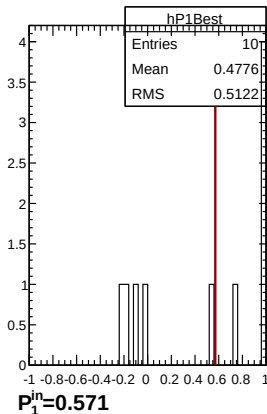
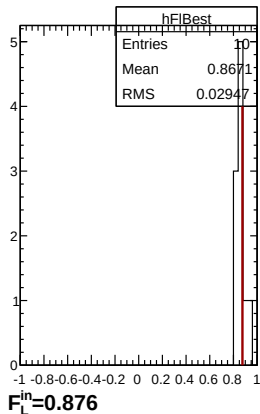
- Issue: try to perform an injection test with LHCb physical parameters to check for any bias in our analysis
- How: generate TOY MC from pdf using LHCb parameters as input and try to fit those toys
 - ① GEN-level (w/o eff)
 - ② RECO-level (w/ eff)
 - ③ RECO-level cocktail (w/ eff and background)
- Only fit with good results are considered.
- for each case (and bin):
 - ▶ generate 10 toys
 - ▶ fit 100 times with input values generated randomly (3D gaussian)
 - ▶ get the fit with best EDM
 - ▶ plot the results of the fit for the 10 toys
 - ▶ compare with input value

Fit results for all toys Bin 0: GEN-level fit



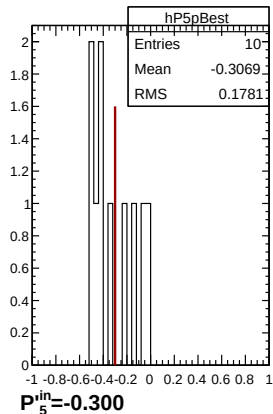
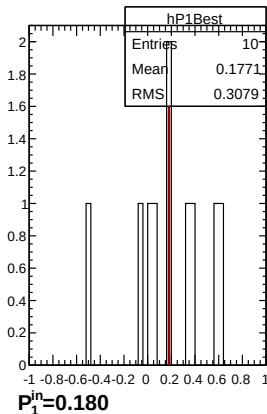
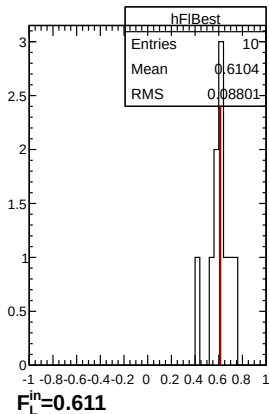
Red line is input value

Fit results for all toys Bin 1: GEN-level fit



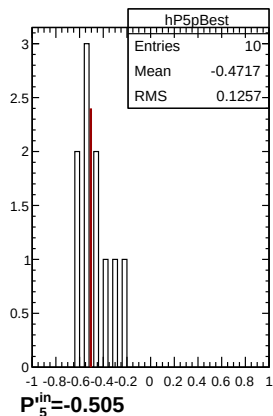
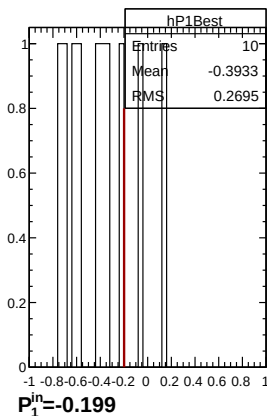
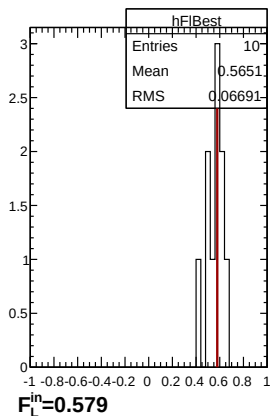
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Fit results for all toys Bin 2: GEN-level fit



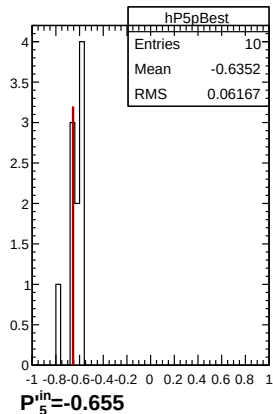
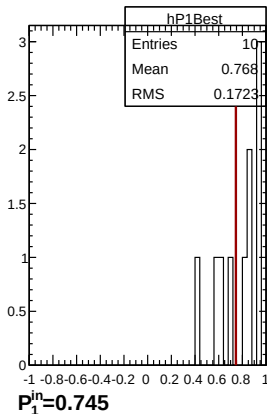
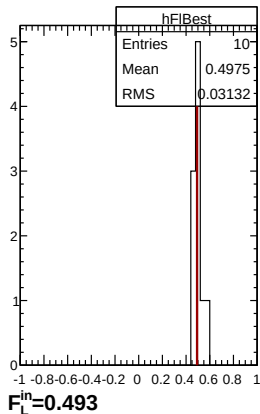
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Fit results for all toys Bin 3: GEN-level fit



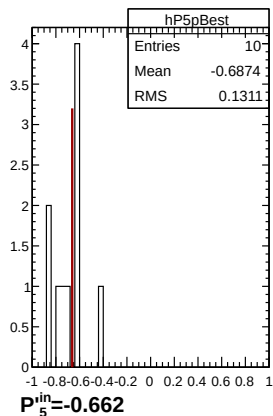
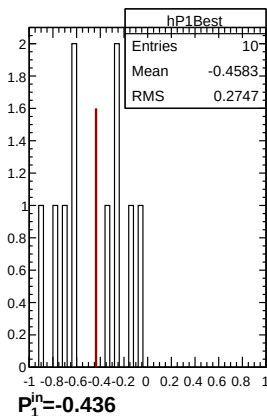
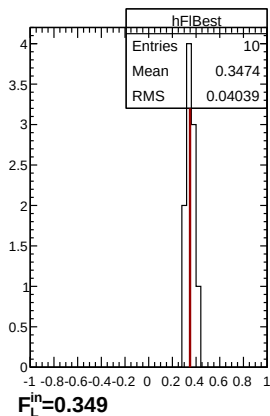
Red line is input value

Fit results for all toys Bin 5: GEN-level fit



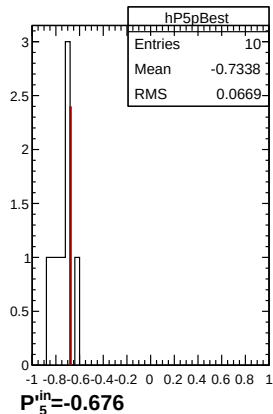
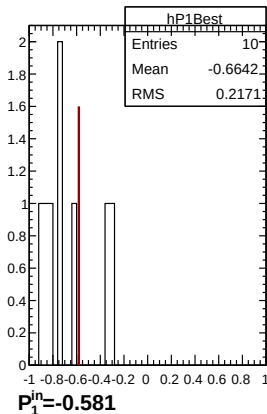
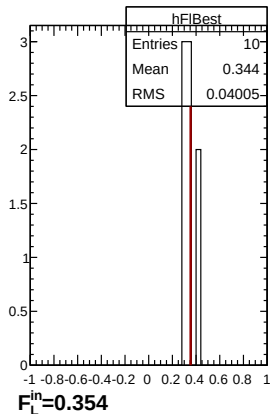
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Fit results for all toys Bin 7: GEN-level fit



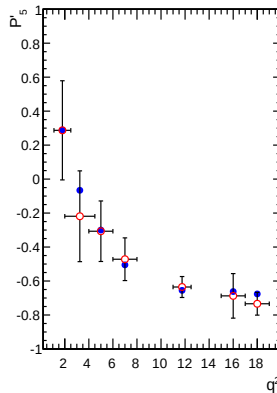
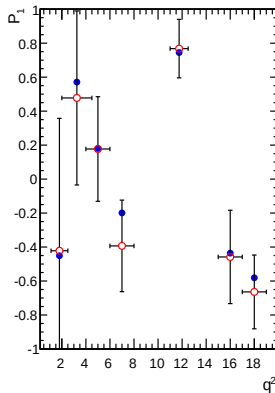
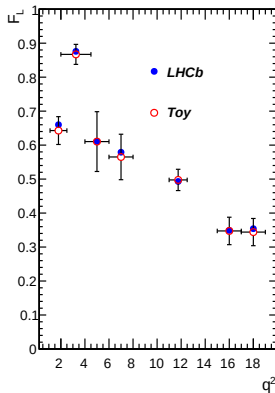
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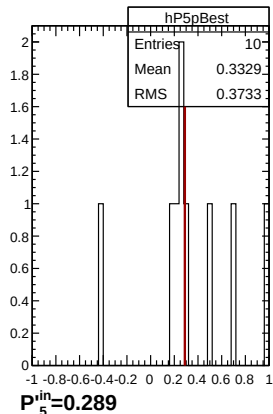
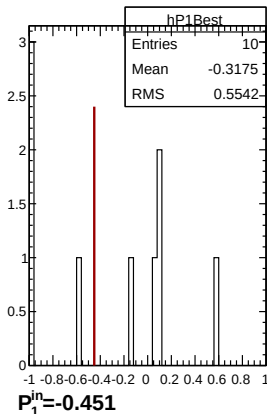
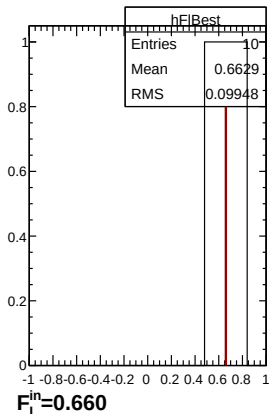
Fit results for all toys Bin 8: GEN-level fit



Red line is input value

Summary GEN-level fit

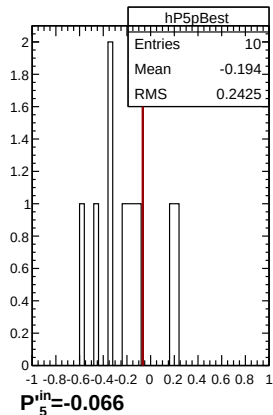
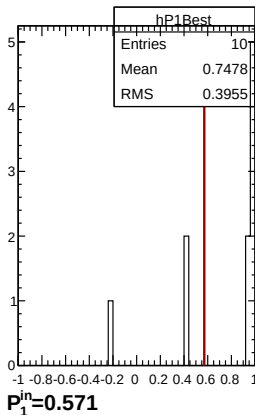
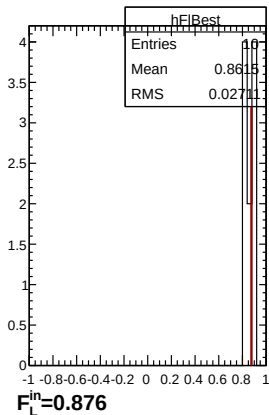




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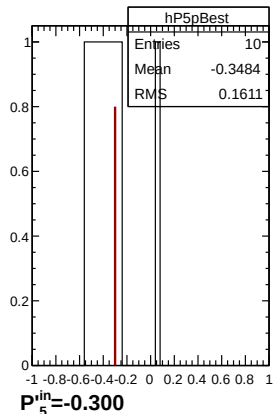
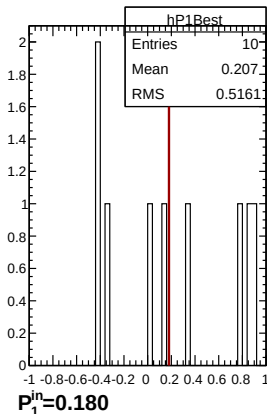
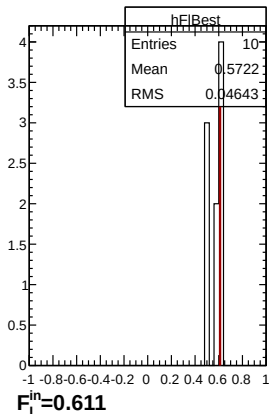
Fit results for all toys Bin 1: RECO-level fit w/o bkg



Red line is input value



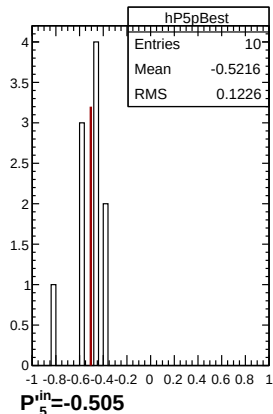
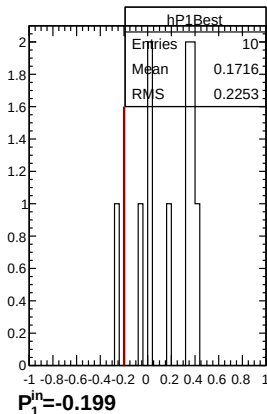
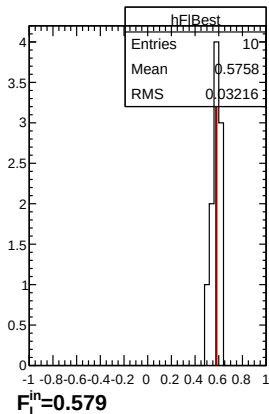
Fit results for all toys Bin 2: RECO-level fit w/o bkg



Red line is input value



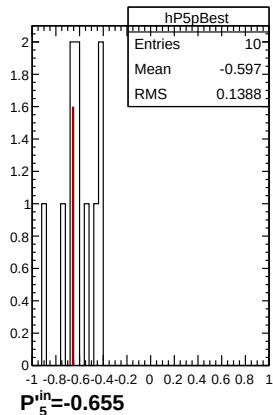
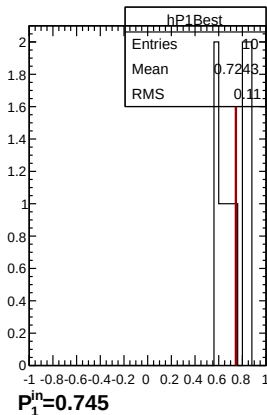
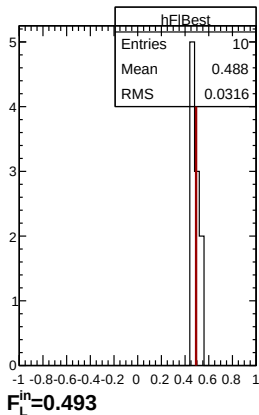
Fit results for all toys Bin 3: RECO-level fit w/o bkg



Red line is input value



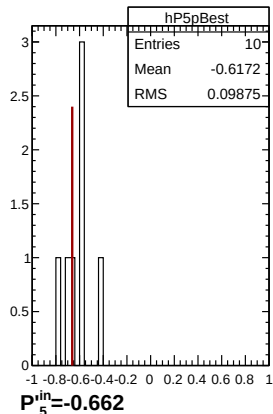
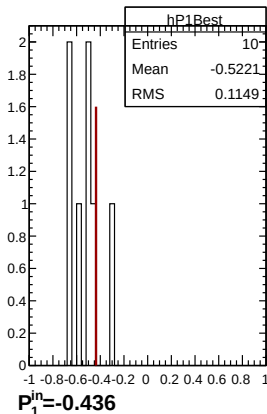
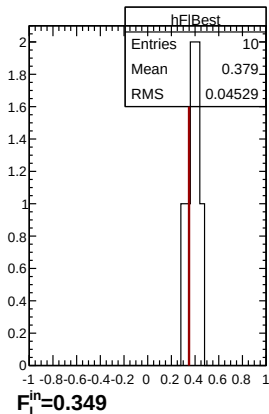
Fit results for all toys Bin 5: RECO-level fit w/o bkg



Red line is input value



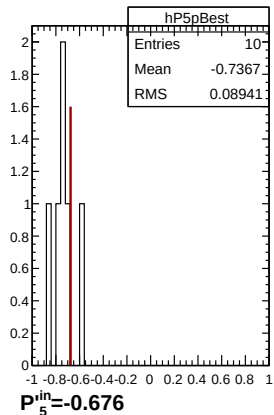
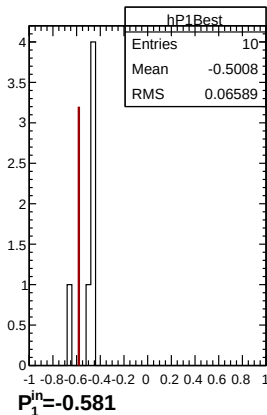
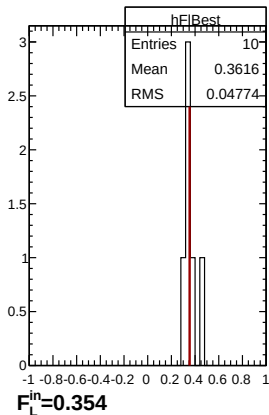
Fit results for all toys Bin 7: RECO-level fit w/o bkg



Red line is input value

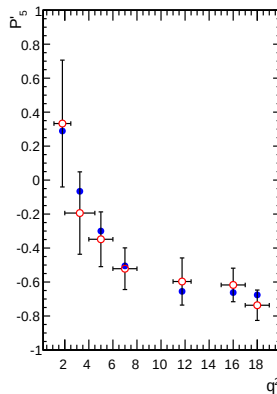
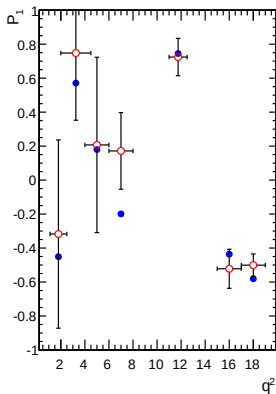
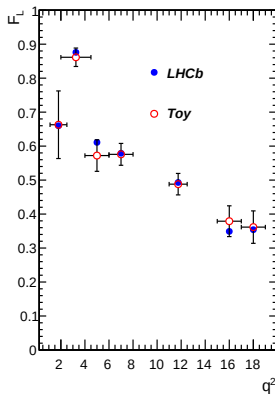


Fit results for all toys Bin 8: RECO-level fit w/o bkg

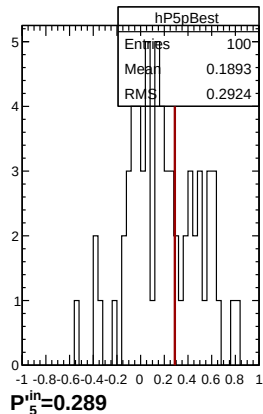
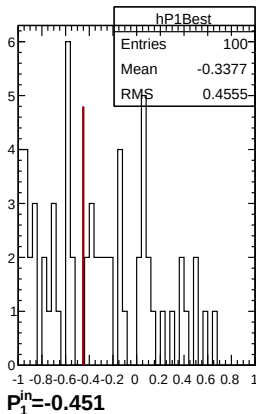
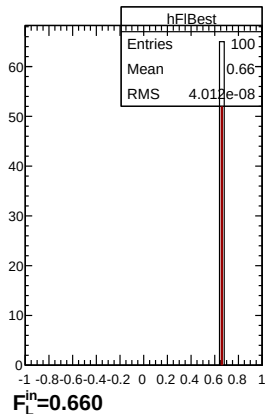


Red line is input value

Summary RECO-level fit w/o background

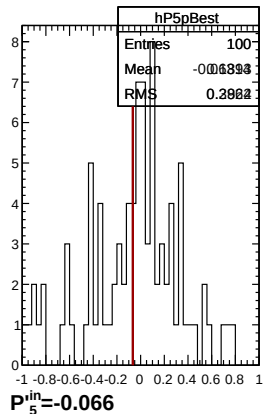
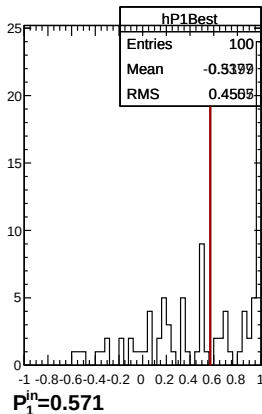
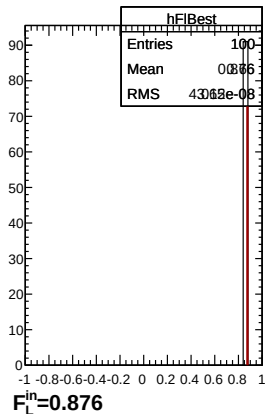


Fit results for all toys Bin 0: RECO-level fit w/ bkg



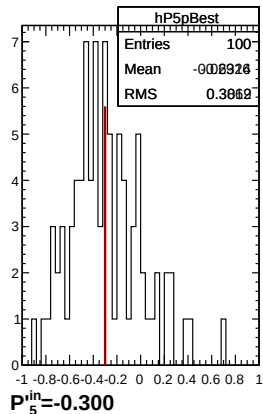
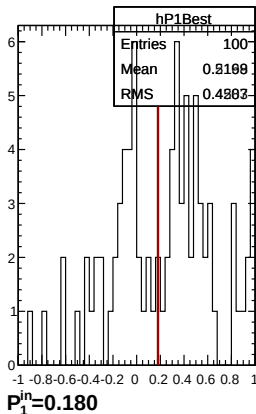
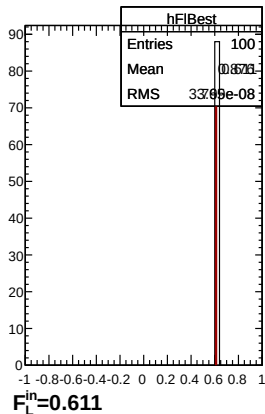
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Fit results for all toys Bin 1: RECO-level fit w/ bkg



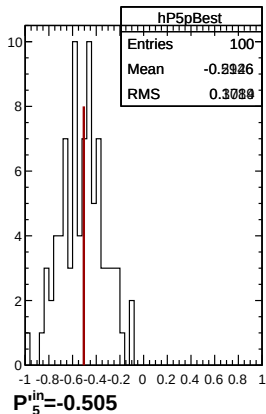
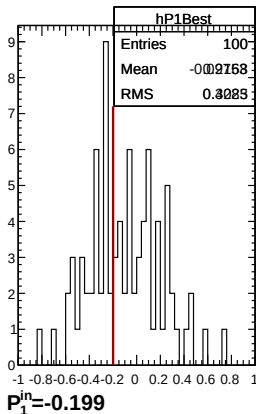
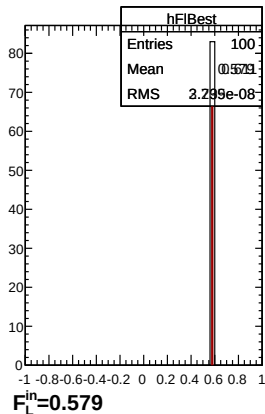
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Fit results for all toys Bin 2: RECO-level fit w/ bkg



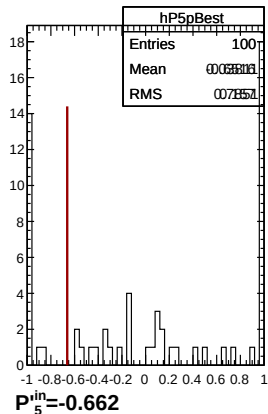
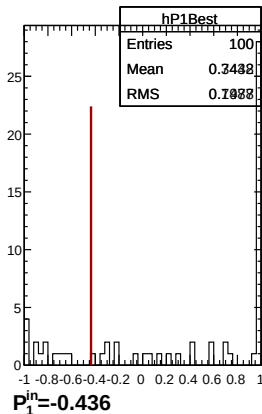
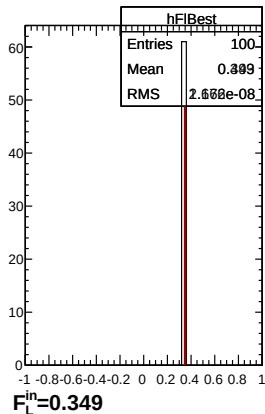
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Fit results for all toys Bin 3: RECO-level fit w/ bkg



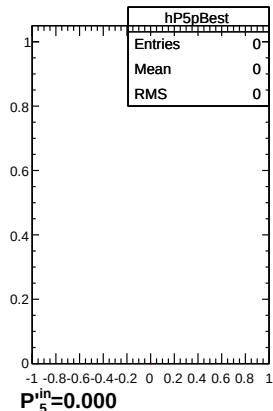
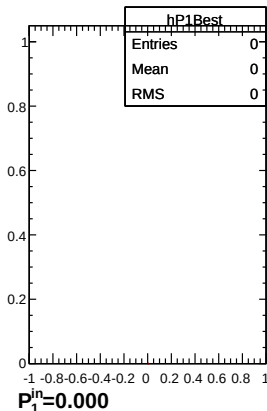
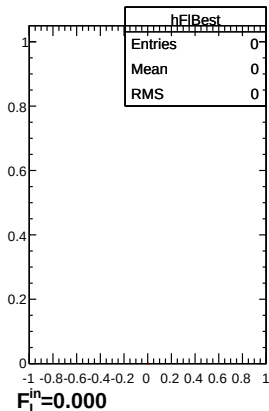
Red line is input value

Fit results for all toys Bin 5: RECO-level fit w/ bkg



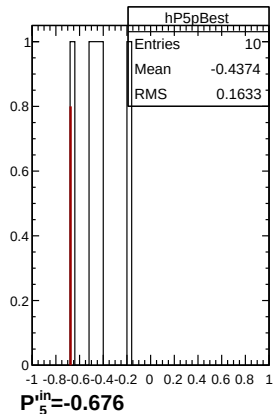
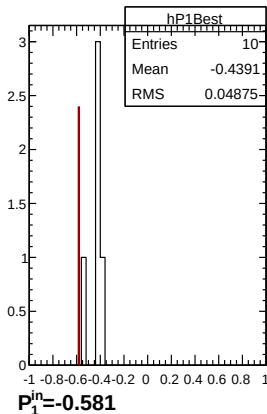
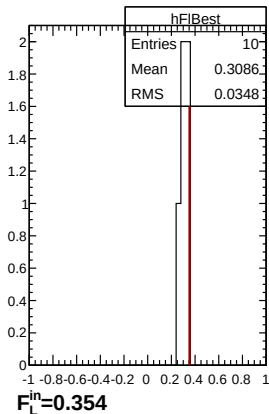
Red line is input value

Fit results for all toys Bin 7: RECO-level fit w/ bkg



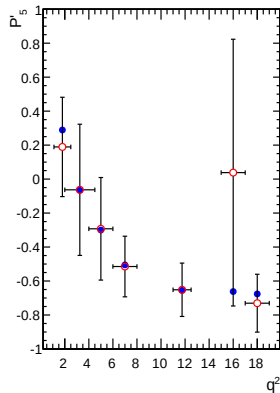
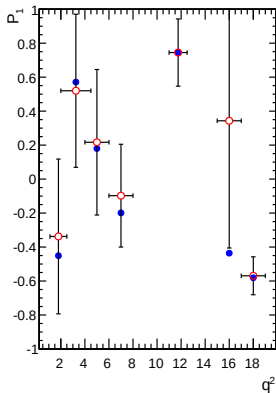
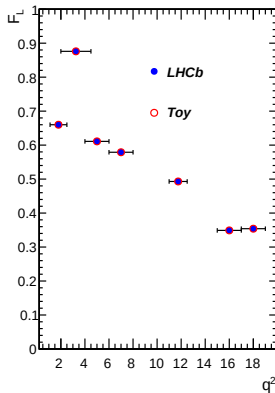
Red line is input value

Fit results for all toys Bin 8: RECO-level fit w/ bkg



Red line is input value

Summary RECO-level fit w/ background



Additional or backup slides

- Question from ARC:

Keith Could you do a MC injection test where you inject a given value of $P5'$ (for example the LHCb central value) and show that you can fit it back?

Wolfram As already briefly mentioned after the pre-approval presentation and also requested by Keith, it would be very good to demonstrate that you can correctly reproduce a result if it is different from the input of your MC. Even if you can not simply dial a different value into your generator, it should be possible to extract subsamples from the existing reconstructed MC by properly selecting events according to the relative frequency of the generator level decay angles.

- Answer

- Answer
- Not possible to generate new MC with different parameters
 - ▶ The MC does not have the physical observables (F_L , P'_5 , ...) as free parameters to be set at will. It has an angular distribution which is not easily changeable
 - ▶ that's the reason why we compare GEN-level fit with RECO-level fit in the MC, as opposed to RECO-level observables with input observables: we do not have access to input parameters.
- Two possible workaround:
 - ① generate TOY MC from pdf using LHCb parameters as input and try to fit those toys
 - ★ can be done at GEN-level (w/o eff) and RECO-level (w/ eff), and w/ and w/o background (cocktail-like toys)
 - ② reweight the original MC at gen level according to the LHCb pdf and refit the full MC with this reweight
- working on 1
 - ▶ So far, I got a toy MC distribution, with out yield, correct and mis-tag, no background (yet)
 - ▶ still checking if correct,
 - ▶ next is to perform a fit.

