New calibration figures for pre-TDR

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OVERVIEW

- New figures for preTDR
  - Calibrations for π^+ and neutrons using the **latest simulation campaign**

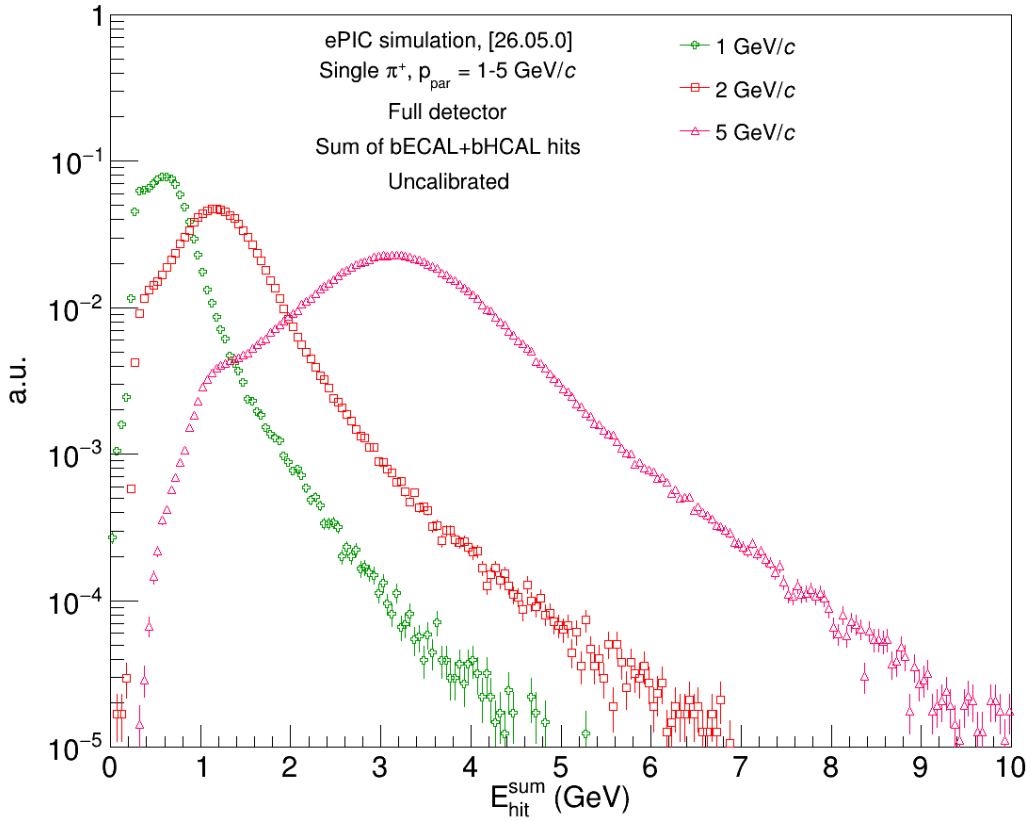
MANUAL CALIBRATION METHODS

- Single particle calibrations
  - **New version with latest simulation campaign (26.05.0)**
  - Have π^+ and neutrons
  - Will add π^- to re-produce old figures

- All presented calibrations use Method 2
  - Currently the only verified calibration method
  - $E_{calib} = A(E_{EMCAL} + BE_{bHCAL})$
  - Plot $(E_{EMCAL} + BE_{bHCAL})/E_{par,MC}$
    - First find B for which the distribution above has the smallest σ/μ
    - A is set as 1/mean of the distribution with optimal B

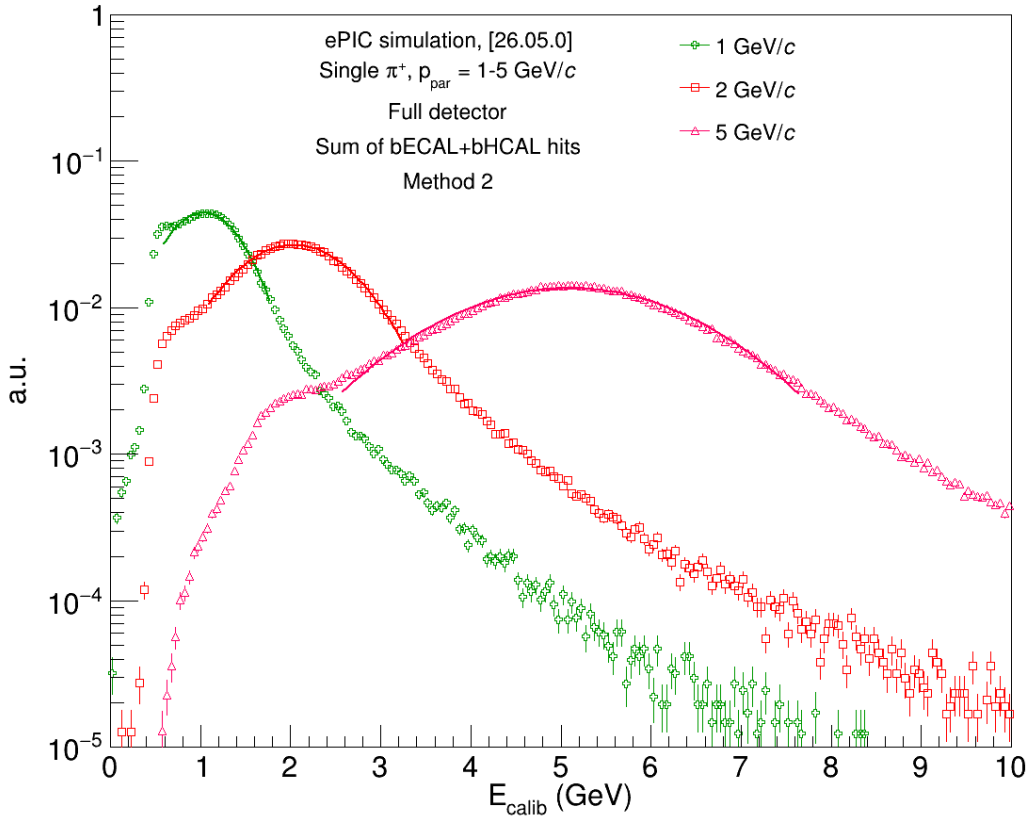
UNCALIBRATED ENERGY – π^+

- Uncalibrated energy deposition in bECAL+bHCAL for π^+
  - Single particle simulation
  - Three energies



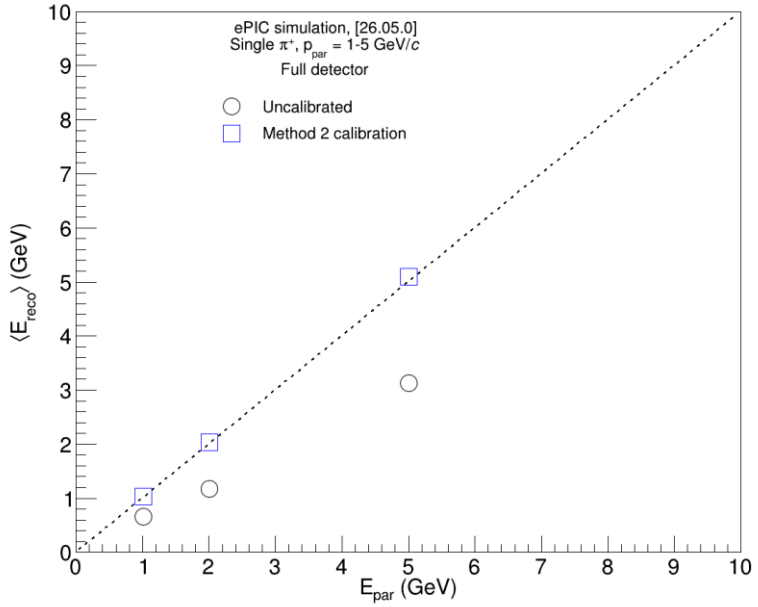
CALIBRATED ENERGY – π^+

- Calibrated energy deposition in bECAL+bHCAL for π^+
  - Method 2 manual calibration
  - Calibration done using RC information only
    - Reference momentum from tracking

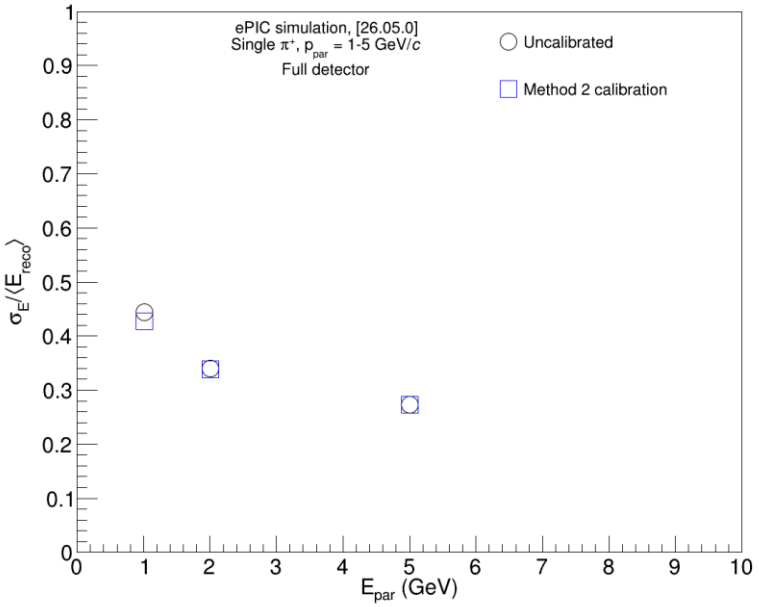


CALIBRATION RESULT – π^+

- (top) MC π^+ energy vs. mean RC π^+ calibrated energy

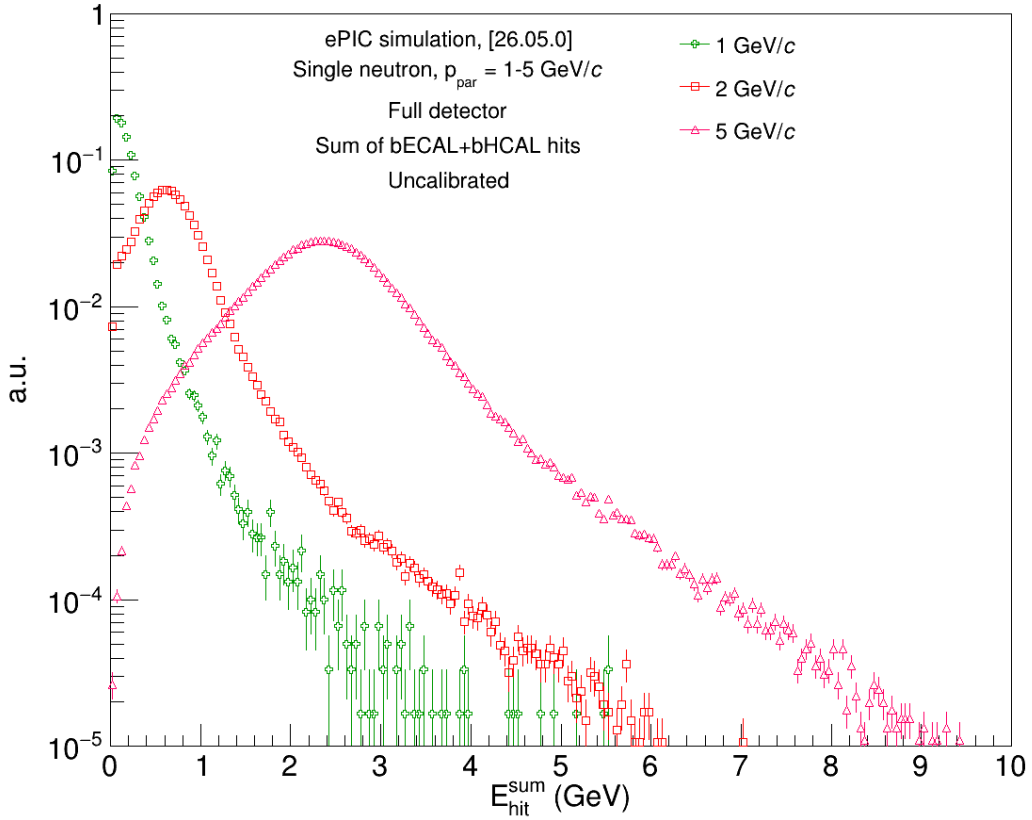


- (bottom) Energy resolution for π^+



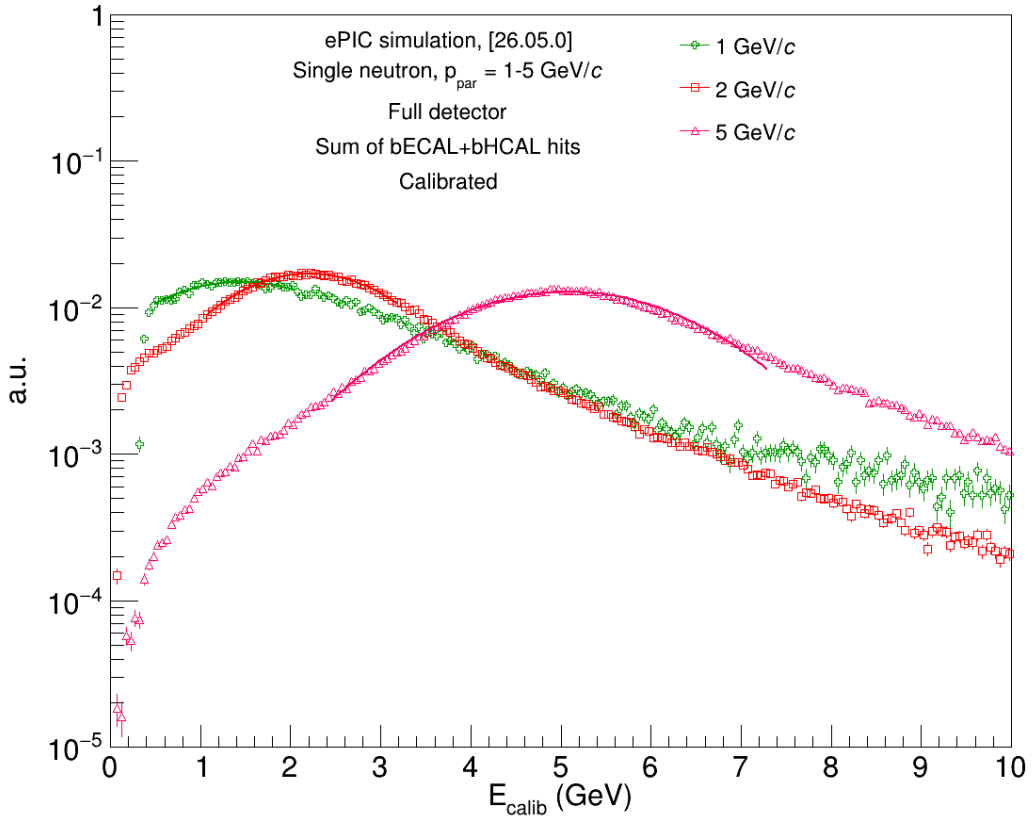
UNCALIBRATED ENERGY – n

- Uncalibrated energy deposition in bECAL+bHCAL for neutrons
  - Single particle simulation
  - Three energies



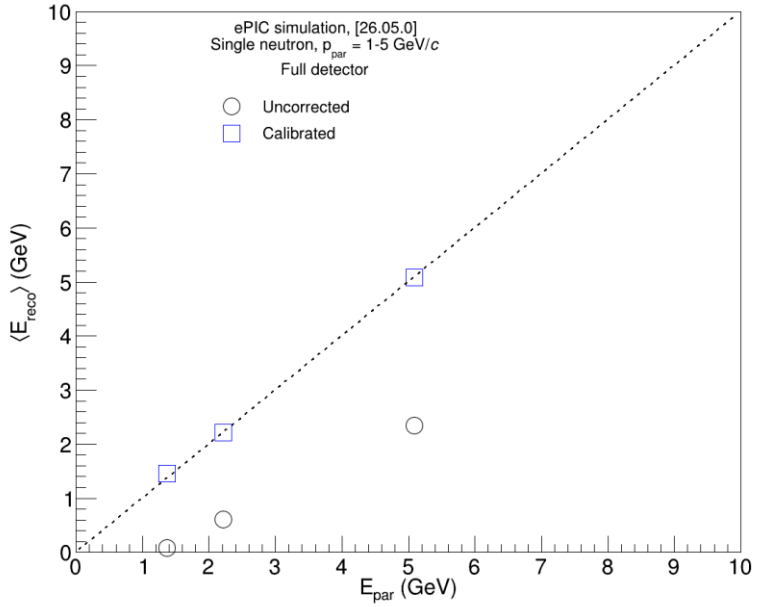
CALIBRATED ENERGY – n

- Calibrated energy deposition in bECAL+bHCAL for neutrons
  - Method 2 manual calibration
  - Calibration done using MC momentum
  - 1 GeV behaves better than in older campaign
    - Can keep default binning

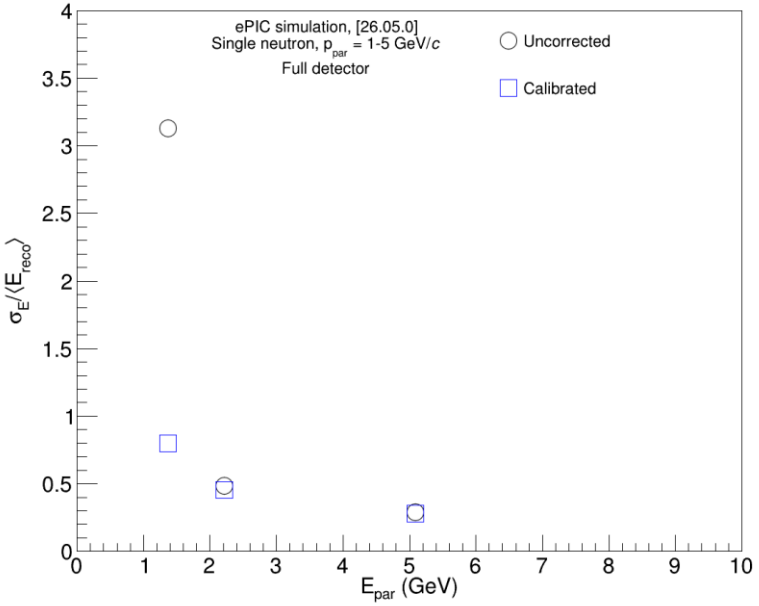


CALIBRATION RESULT – n

- (top) MC n energy vs. mean RC n calibrated energy



- (bottom) Energy resolution for n



SUMMARY AND OUTLOOK

- Produced new version of updated plots for pre-TDR
  - **Simulation campaign 26.05.0**
  - Finished for π^+ and neutrons
  - Method 2 manual calibration
    - Using tracking information for π^+
    - Using MC information for neutrons

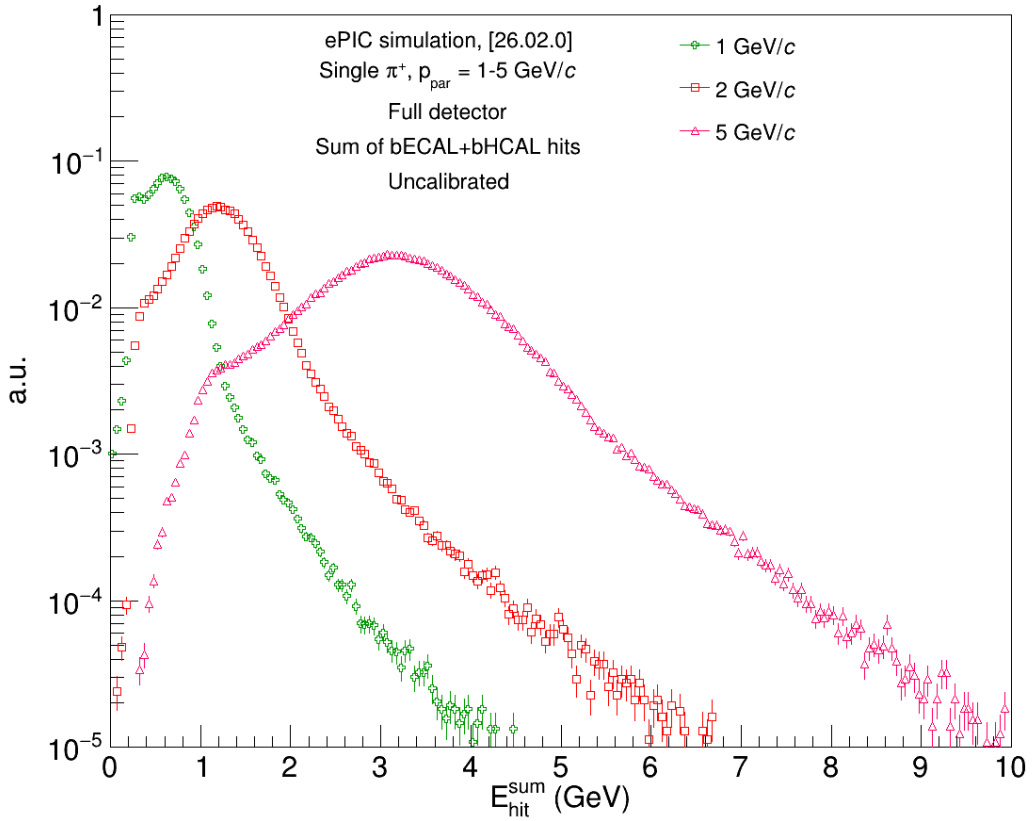
- Outlook:
  - Add π^- calibration to match original plots
  - Any suggestions to formatting welcome

THANK YOU FOR ATTENTION

BACKUP

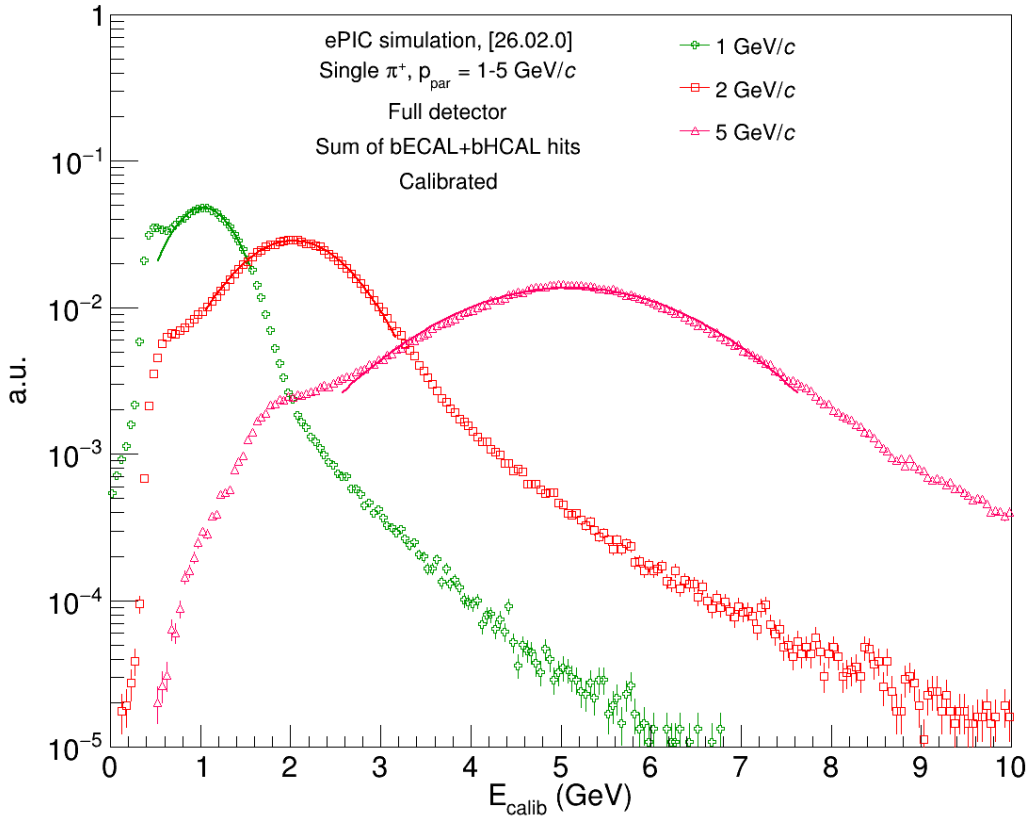
UNCALIBRATED ENERGY – π^+ (OLD)

- Uncalibrated energy deposition in bECAL+bHCAL for π^+
  - Single particle simulation
  - Three energies



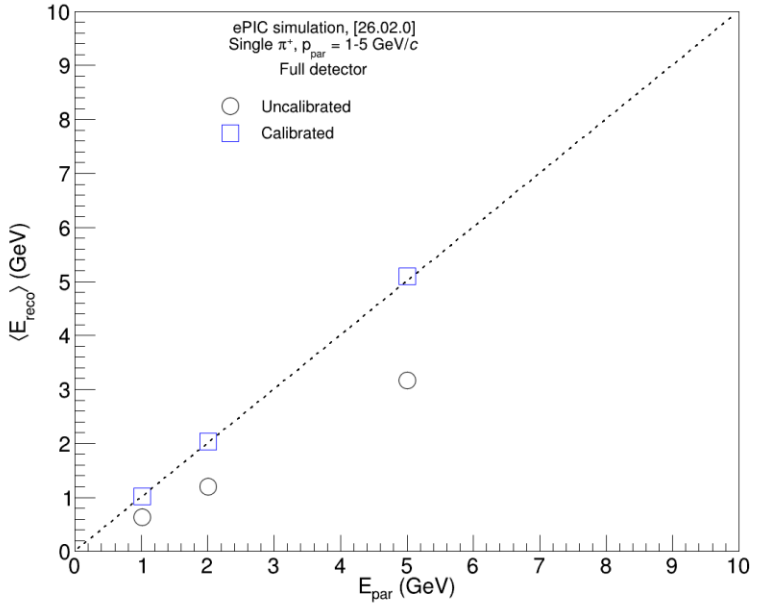
CALIBRATED ENERGY – π^+ (OLD)

- Calibrated energy deposition in bECAL+bHCAL for π^+
  - Method 2 manual calibration
  - Calibration done using RC information only
    - Reference momentum from tracking

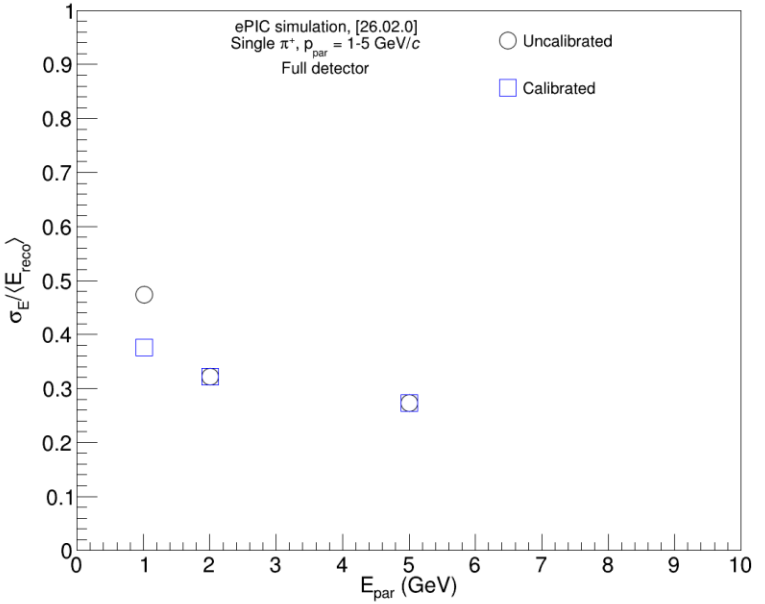


CALIBRATION RESULT – π^+ (OLD)

- (top) MC π^+ energy vs. mean RC π^+ calibrated energy

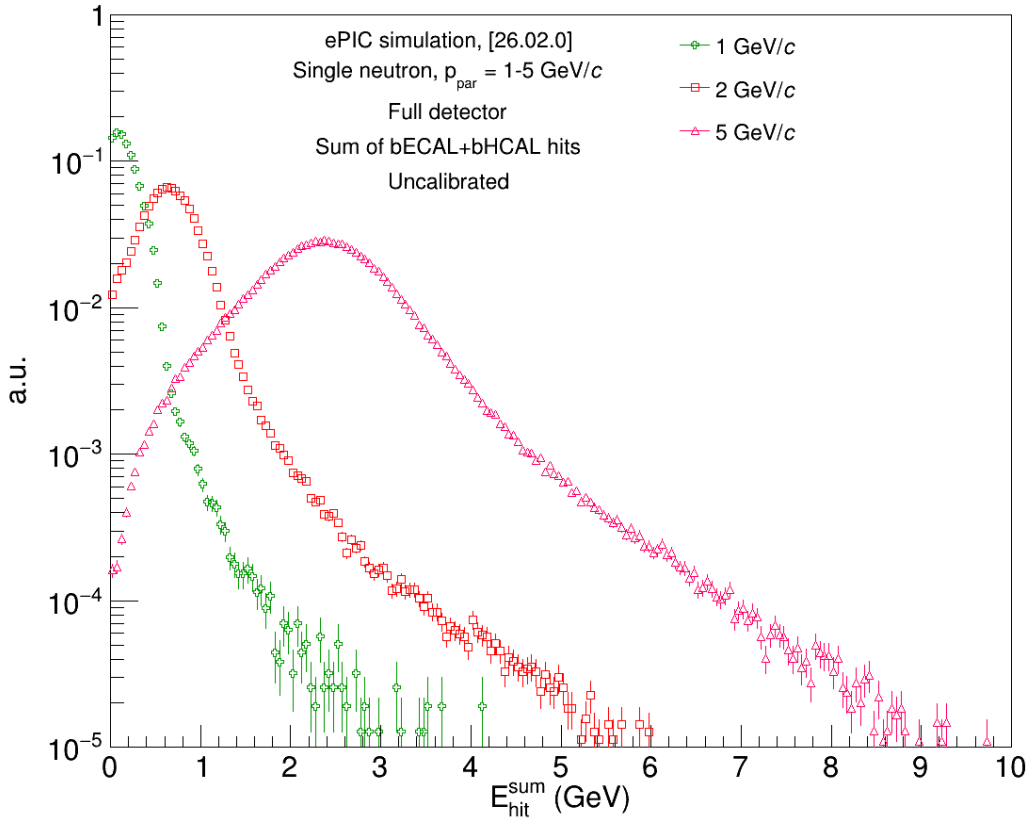


- (bottom) Energy resolution for π^+



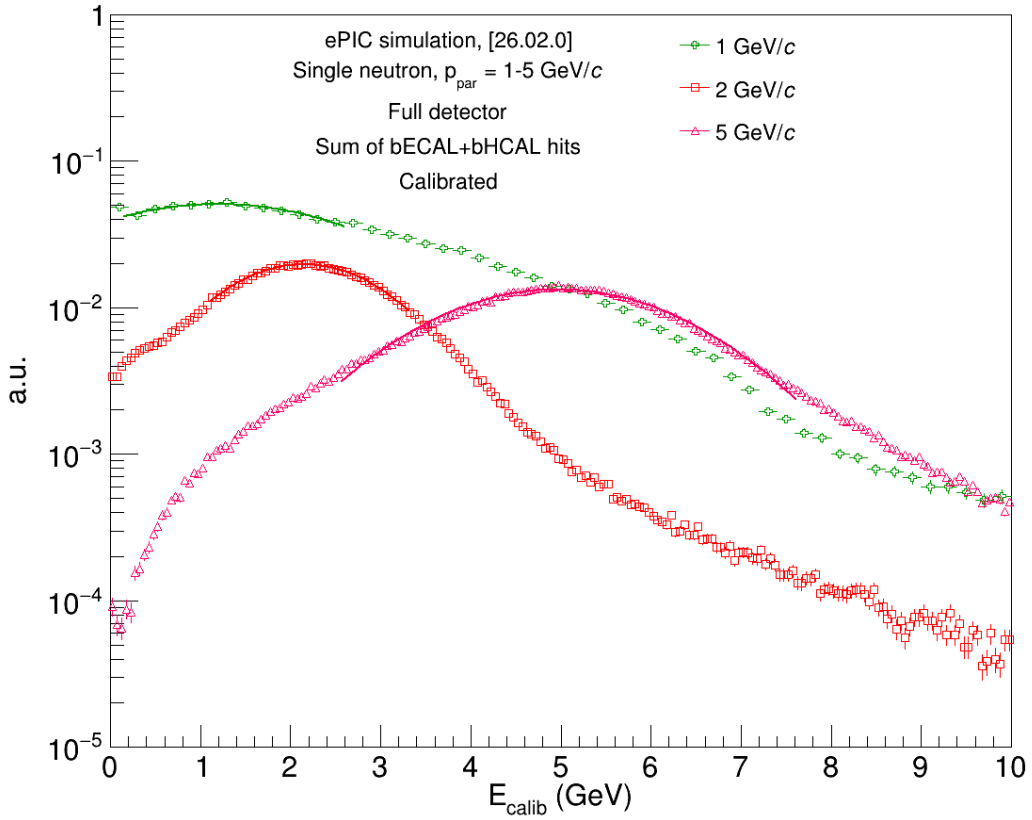
UNCALIBRATED ENERGY – n (OLD)

- Uncalibrated energy deposition in bECAL+bHCAL for neutrons
  - Single particle simulation
  - Three energies



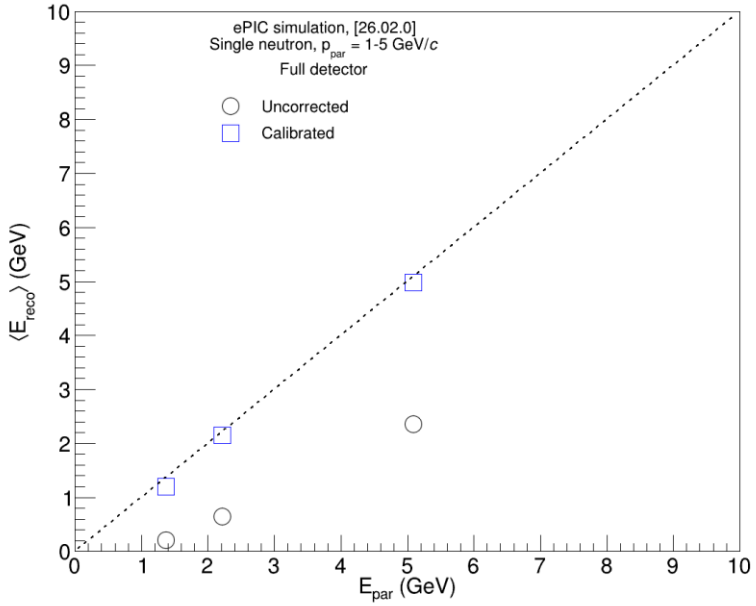
CALIBRATED ENERGY – n (OLD)

- Calibrated energy deposition in bECAL+bHCAL for neutrons
  - Method 2 manual calibration
  - Calibration done using MC momentum
  - 1 GeV has different binning, as the calibration factor is large which generates binning artifacts with default fine binning
    - Should we switch all distribution to larger bins?



CALIBRATION RESULT – n (OLD)

- (top) MC n energy vs. mean RC n calibrated energy



- (bottom) Energy resolution for n