FCC Napoli – TB analysis

WEEKLY REPORT - 09 MAY 2025

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New energy calibration – bias correction

- 1. Fixed the asymmetry of the U-plot \rightarrow Calibration lines are comparable for each branch
- New error estimation → Points near the deposition peaks (0° and 180°, most sensitivity) are "reweighted" better in the fit

$$E' = E(\theta_{true}) = E(\theta + \hat{b})$$

$$\sigma_{up}(E') = |MC(E' + \hat{\sigma}_{bias}) - MC(E')|$$

$$\sigma_{down}(E') = |MC(E') - MC(E' - \hat{\sigma}_{bias})|$$



Given Work in progress: *fixing the model*

Piecewise function implemented in a single fit

$$\left(\begin{array}{c} [0]\\ \overline{\cos([1]*\theta - [2])} + [3], \quad x \le \theta_c \end{array}\right)$$

$$E(\theta) = \begin{cases} \frac{[4]}{\sin([5] * \theta - [6])} + [7], & \theta_c < x < 180^\circ - \theta_c \end{cases}$$

$$\left| \frac{[8]}{\cos([9] * \theta - [10])} + [11], \qquad x \ge 180^{\circ} - \theta_c \right|$$

■ Make a more robust model → reduce number of parameters:

- Imposed the continuity
- Imposed the continuity of derivative
- Imposed the simmetry at 0° and 180°
- Imposed the normalizaton

Reduced the parameters, but increased the complexity of function; problems with fit convergence

UWork in progress: *Introduce in the model the dependency of energy from alignment*

This would adjust the model around critic angles, next to 0° and 180° - higher deposits

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