

A/q Calculation

Everything is measured and calculated in the FRS section S2-S4. Different degraders are in front and cannot affect the identification procedure.

$$A/q = B\rho / \beta\gamma * \text{const.}$$

with $\gamma = \text{sqrt}(1-\beta^2)$

$$\beta = L / \text{ToF}$$

and

$$B\rho = B\rho_0 [1 + \delta] = B\rho_0 \left[1 + \frac{X_{S2}(X,X) - X_{S4}}{(X,\delta)} \right]$$

The path length (L) depends on $B\rho$ and on transverse angle A . As this is a small correction, we can write it as a Taylor expansion with two factors still to be determined.

$$L = L_0 * (1+f_1 \delta) (1+ f_2 A)$$

The dependence on δ is small compared to the other contributions to A/q already contained in $B\rho$ directly. In this first order approximation choosing slightly different optics coefficients (X,X) or (X,δ) will already include the the path length correction for ToF for the final A/q calculation. Therefore, no separate coefficient f_1 is necessary.

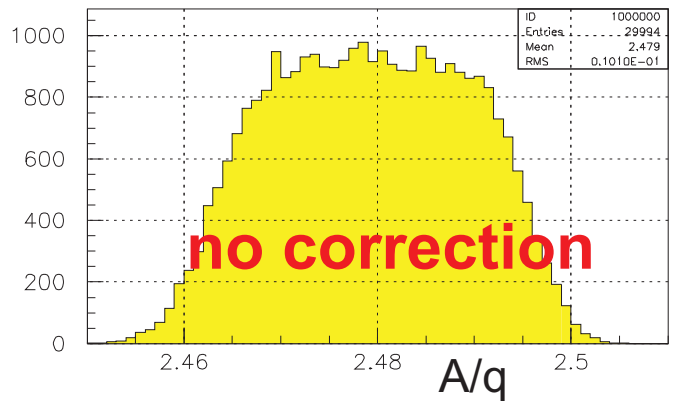
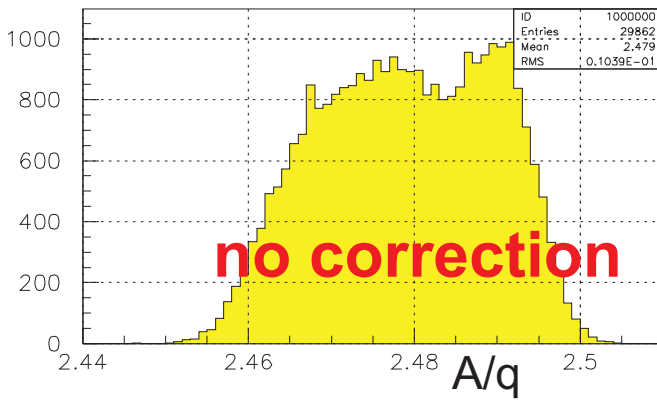
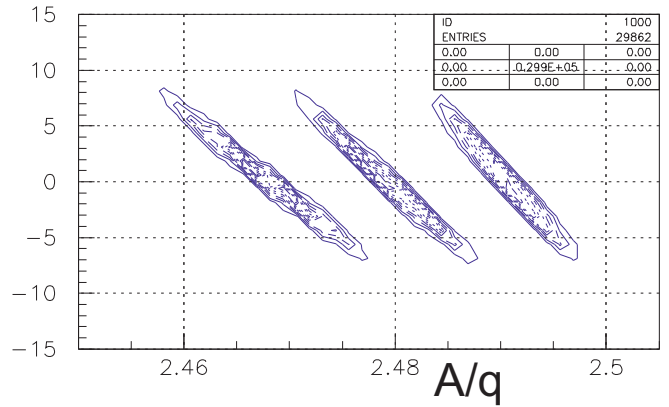
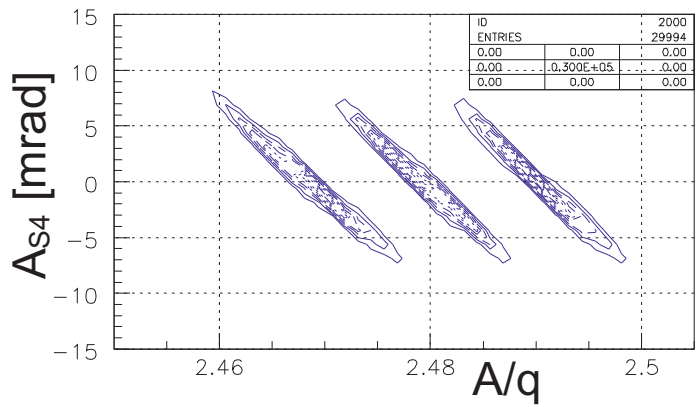
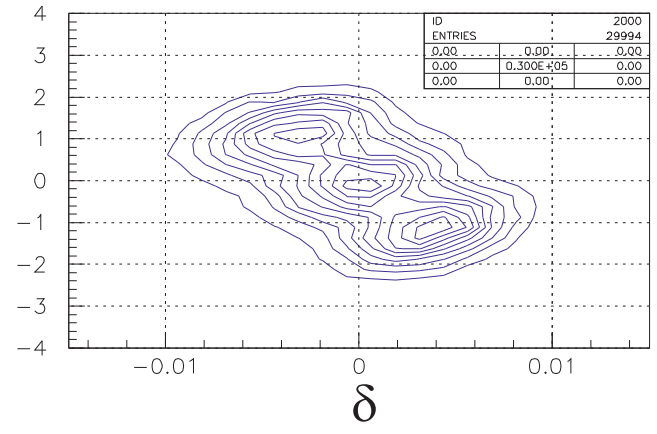
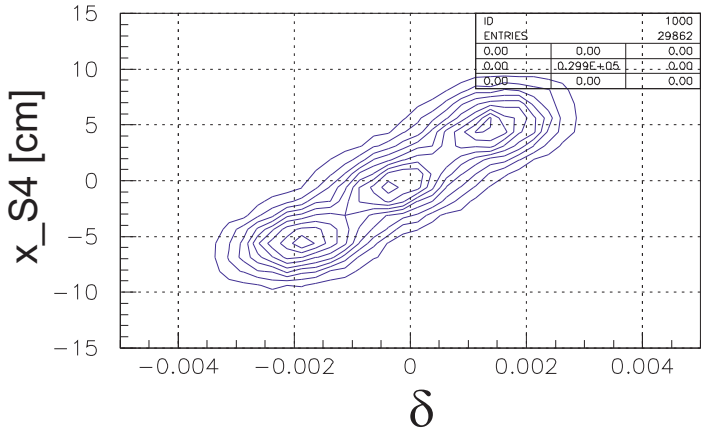
The dependence on A is shown on the next slide. Corrections with X are tiny. As the FRS is in one plane Y and B contribute only in 2nd order.

Simulation for A/q Correction

MOCADI for $^{222,223,224}\text{Th}$ from ^{238}U at 1 GeV/u, FRS in standard optics (RUN81-TA2B), 3 g/cm² Be target, 4 g/cm² S2 Al degrader. Correction proportional to angle A at S4, corrects path length for ToF.

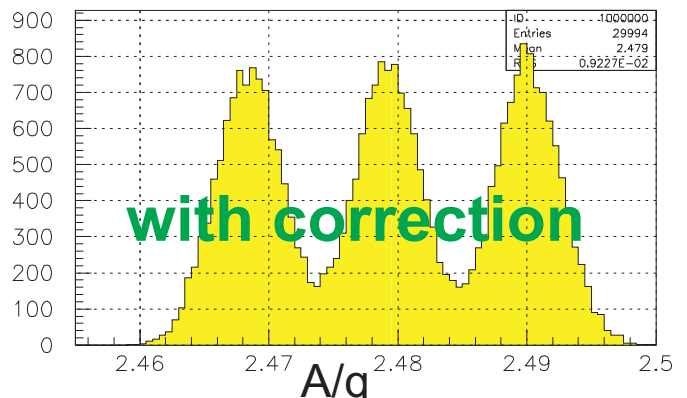
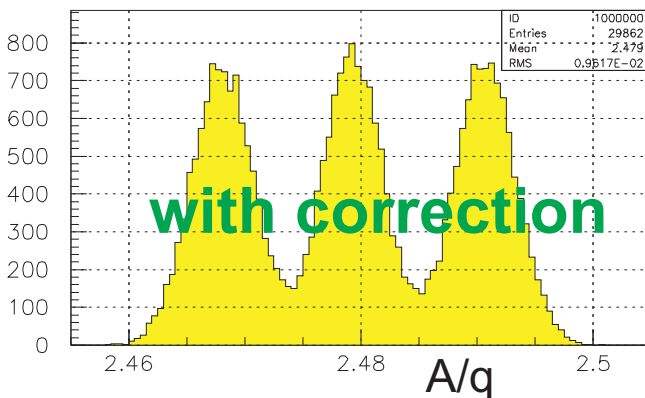
monoenergetic

achromatic



$$a0q*(1.+gauss(0.001))+(a(6)+gauss(0.5))*0.00$$

$$a0q*(1.+gauss(0.001))+(a(6)+gauss(0.5))*0.00$$



$$a0q*(1.+gauss(0.001))+(a(6)+gauss(0.5))*0.0011$$

$$a0q*(1.+gauss(0.001))+(a(6)+gauss(0.5))*0.0011$$

f_1

f_1