

# Optics Status Update

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# Simulation Package

- Physics models in the simulation package:
  - Inelastic XS:
    - QFS model, original version described in *J. W. Lightbody et al, Computers in Physics, 2(1988)57*
    - P. Bosted's Fits, the fitting result is described in *P. E. Bosted et al, Phys. Rev. C, 78(2008)015202* and *arXiv:1203.2262*
    - Radiative correction for QFS from K. Slifer's E94010 technical note

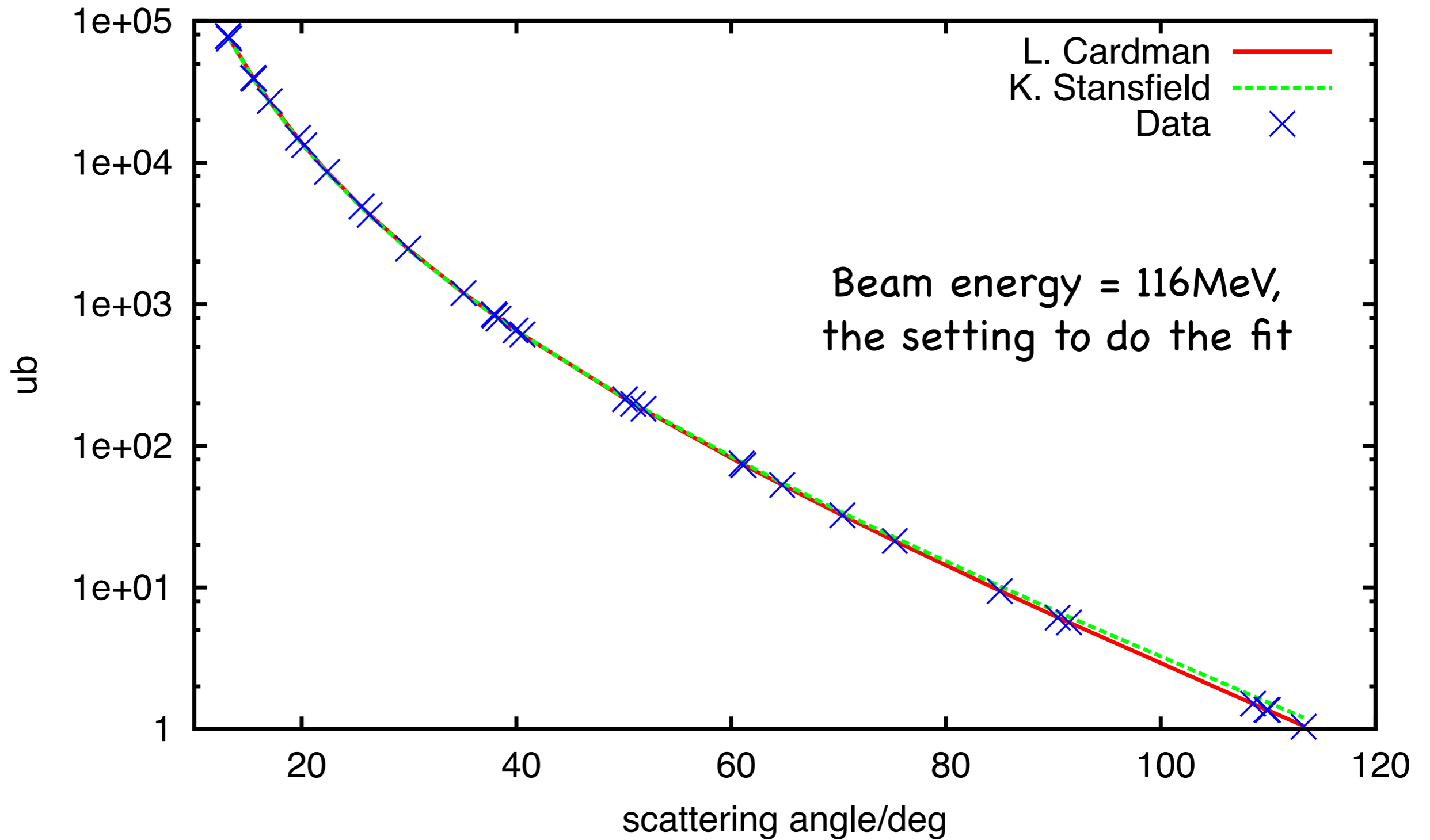
# Simulation Package

- Physics models in the simulation package:
  - Elastic XS:
    - Form Factors from *K. C. Stansfield et al., Phys. Rev. C, 3(1971)1448*
    - For elastic  $^{12}\text{C}$  cross section: fitting result of the  $^{12}\text{C}$  charge distribution from *L. S. Cardman et al., Phys. Lett. B, 91(1970)203*

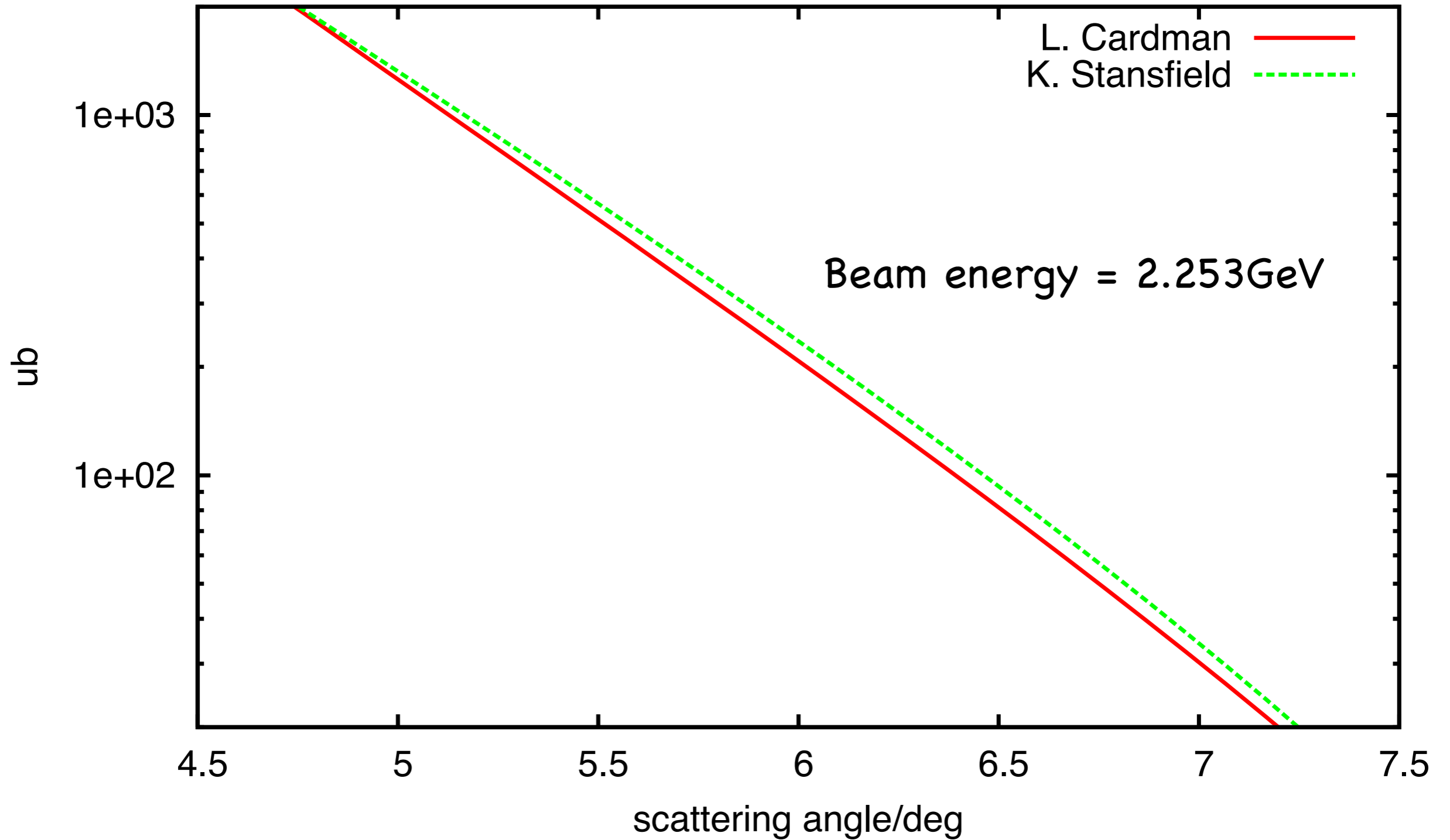
# Simulation Package

- Larry's fit of the  $^{12}\text{C}$  charge distribution:
  - Use Bessel Function to expand the charge density function
  - Provide fitting program and the fitted coefficients of the Fourier-Bessel Expansion
  - Rewrite the code to use these coefficients

# Compare 2 elastic model



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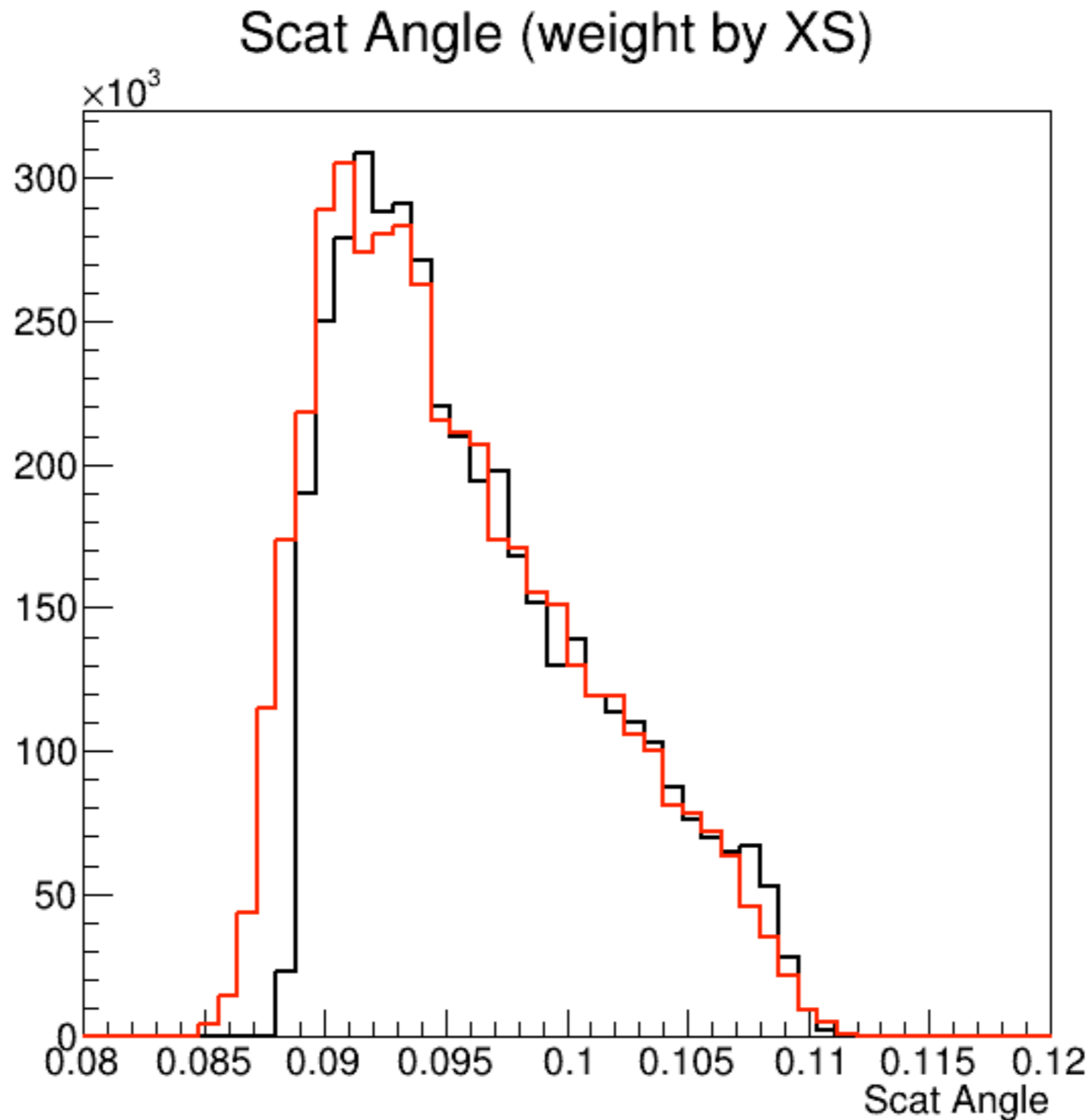


# Simulation Package

- Test conditions:
  - $E = 2.254\text{GeV}$ ,  $P_0 = 2.251\text{GeV}$
  - 28mm target length
  - raster radius set to 1.5cm
  - target field set to 2.5T
  - Use Elastic Carbon XS

# Distribution weighted by XS

$$|\langle \theta_{\text{rec}} \rangle - \langle \theta_{\text{real}} \rangle| = 0.8 \text{ mrad}$$

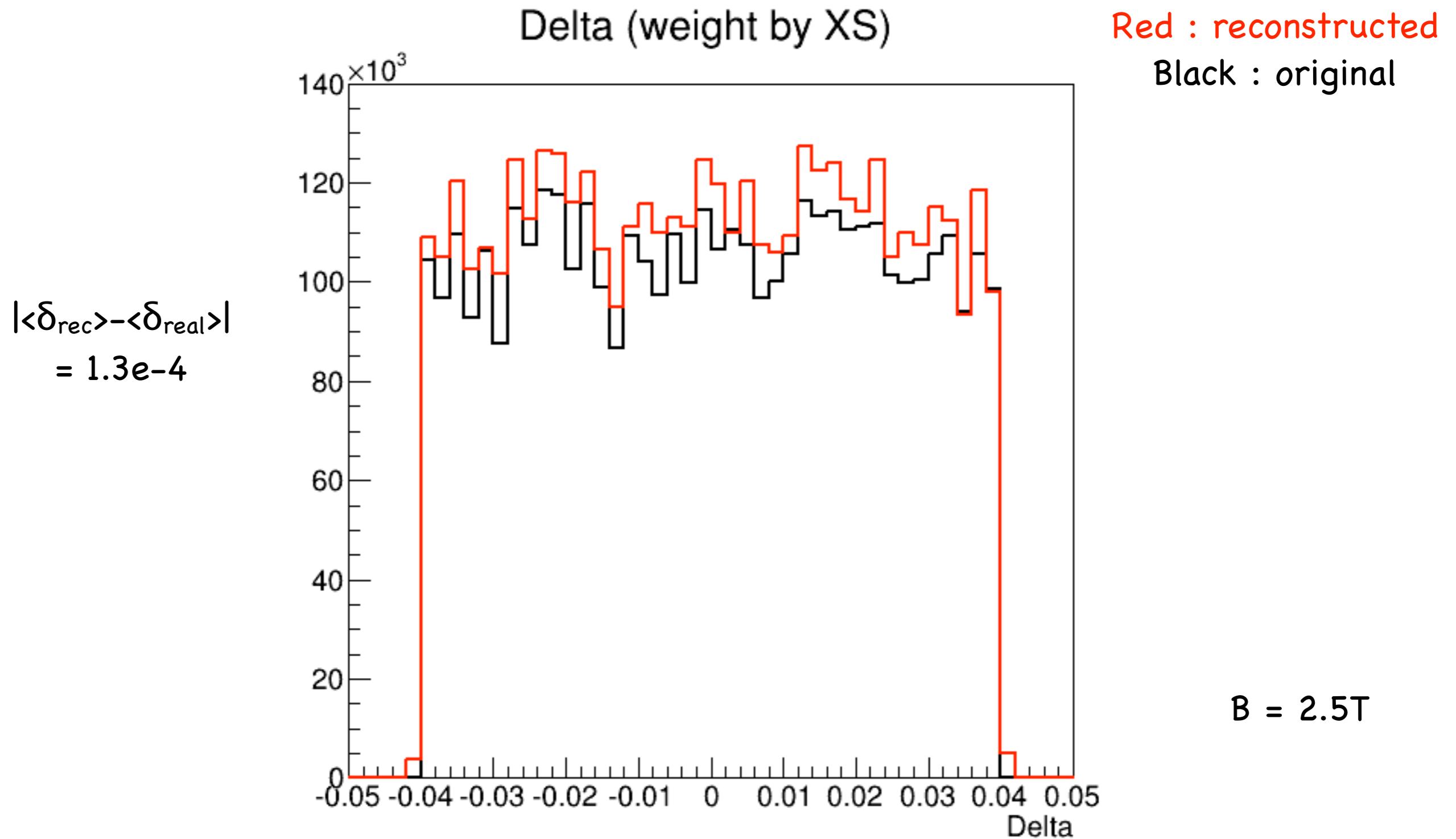


Red : reconstructed  
Black : original

B = 2.5T



# Distribution weighted by XS



# Simulation Package

- TODO
  - Use the same reconstruction procedure on the optics data with target field on
  - Require the calibration of the straight through optics matrix to be finished