

1) Nuclear PDFs

First Step: Include Lead

2) K-Factor technique Update:

K-factor iteration example:

To do: extend to higher order & check stability

TO DO:

FAST QCDNUM TABLE:

New help by Ben Clark & Eric Godat:

Fred Olness
7 August 2013

THANKS TO:

Alex Kusina, Ingo Schienbein, Tzvetalina Stavreva, Ji Young Yu, Ben Clark, Eric Godat

call PDFINP (subr, iset, offset, *epsi, *nwds)
 subroutine SUBR (x, qmu2, xpdf)

SUBR provided w/ 3 options:

- Lead
- Proton
- Ratio

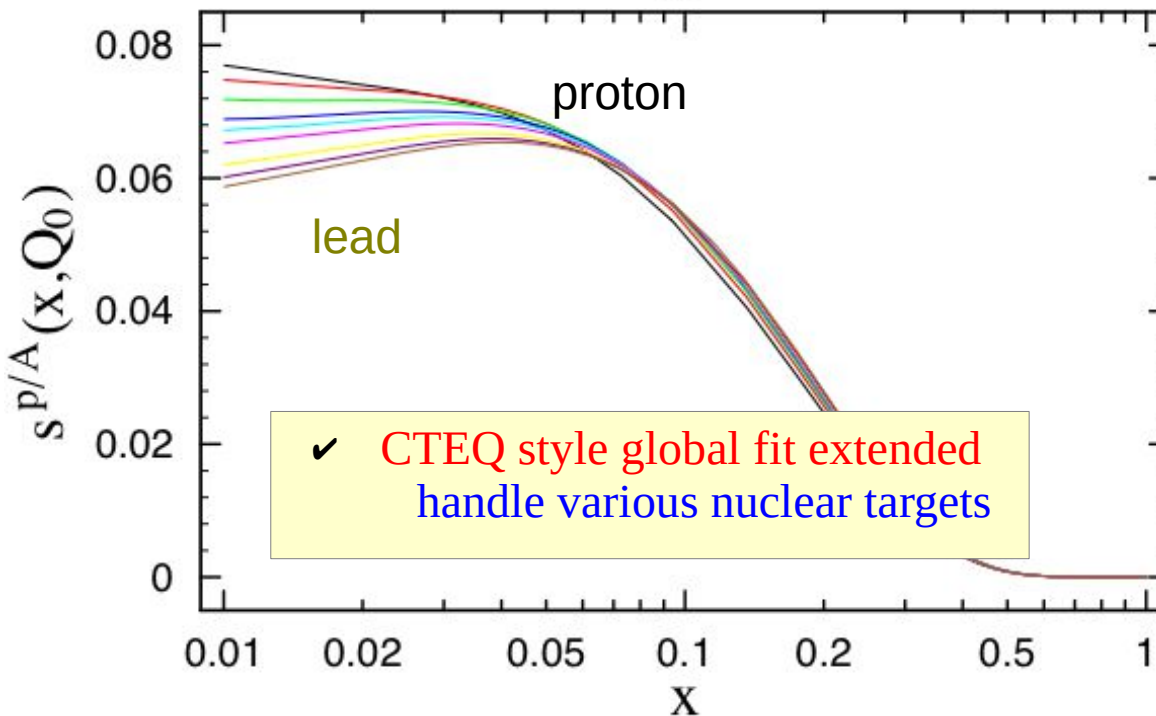
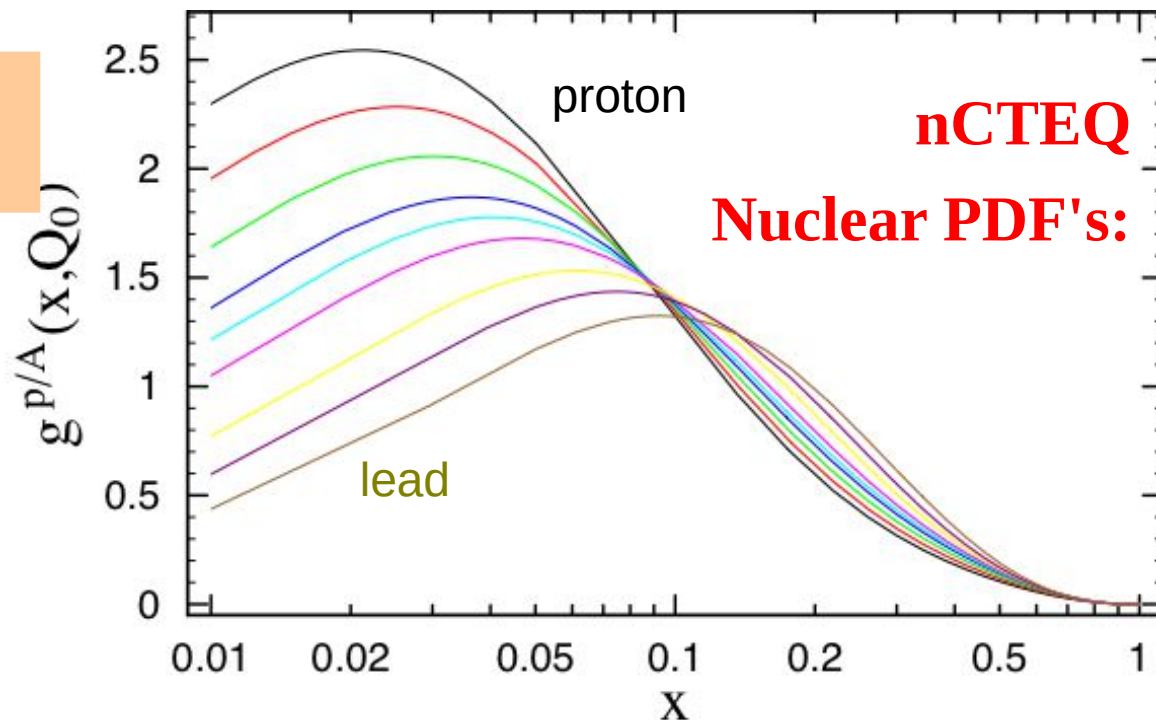
← Compute Nuc corrections for other PDF sets

A-Dependent PDFs

$$xf(x) = x^{a_1} (1-x)^{a_2} e^{a_3 x} (1 + e^{a_4 x})^{a_5}$$

$$a_i \rightarrow a_i(A)$$

$$a_k = a_{k,0} + a_{k,1} (1 - A^{-a_{k,2}})$$



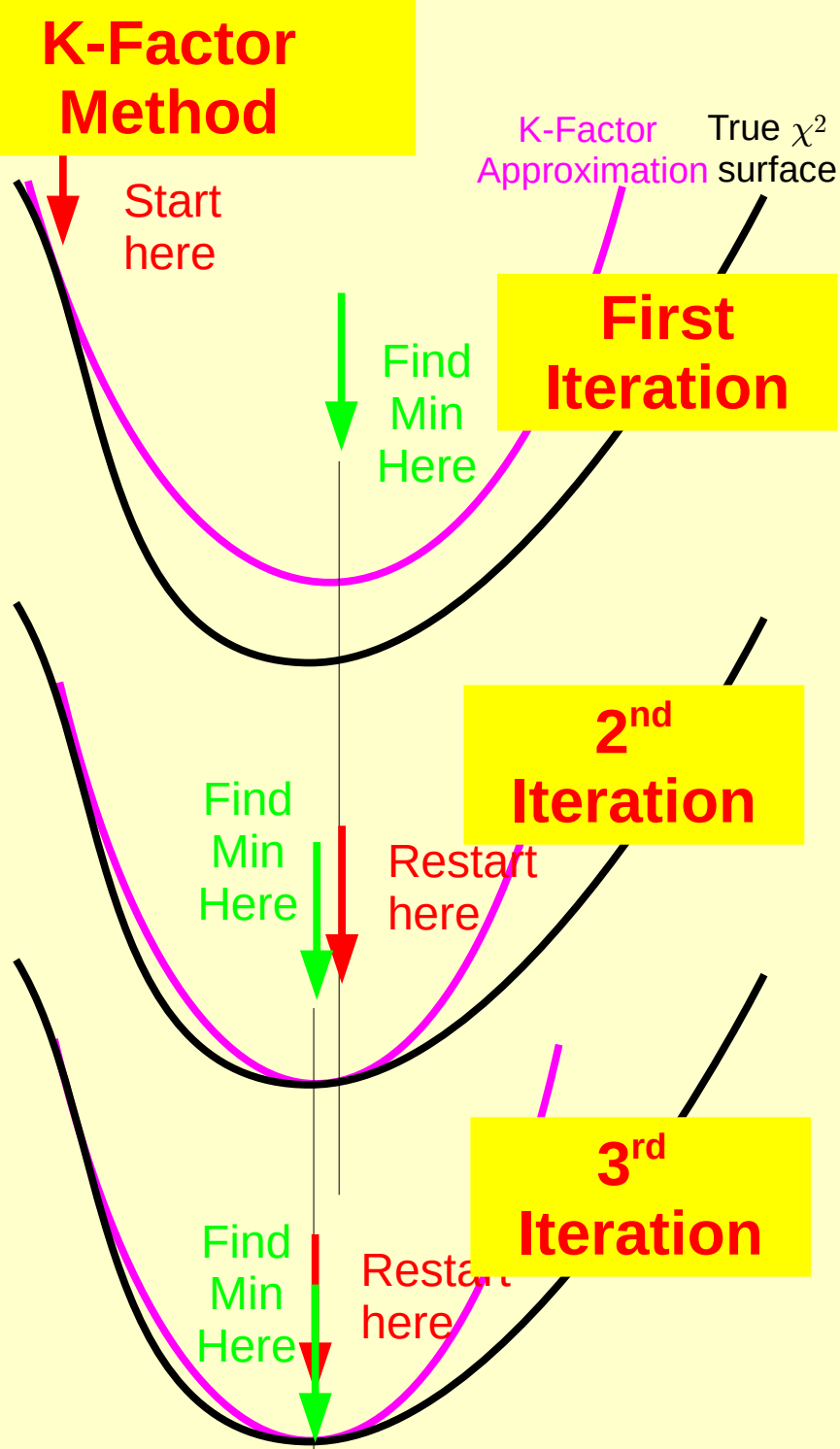
Nuclear PDFs from neutrino deep inelastic scattering.
 I. Schienbein, J.Y. Yu, C. Keppel, J.G. Morfin,
 F. Olness, J.F. Owens. Phys.Rev.D77:054013,2008.

K-Factor Iteration Example

ACOT-FULL: NLO Calculation
"Default" DIS set, 582 points:

K-ACOT	Start	Finish
Iteration 0	626.28	560.00
Iteration 1	562.29	559.24
Iteration 2	560.80	560.71

To do: Extend to N2LO and N3LO



$$K = \frac{\sigma^{FULL}}{\sigma^{Approx}}$$

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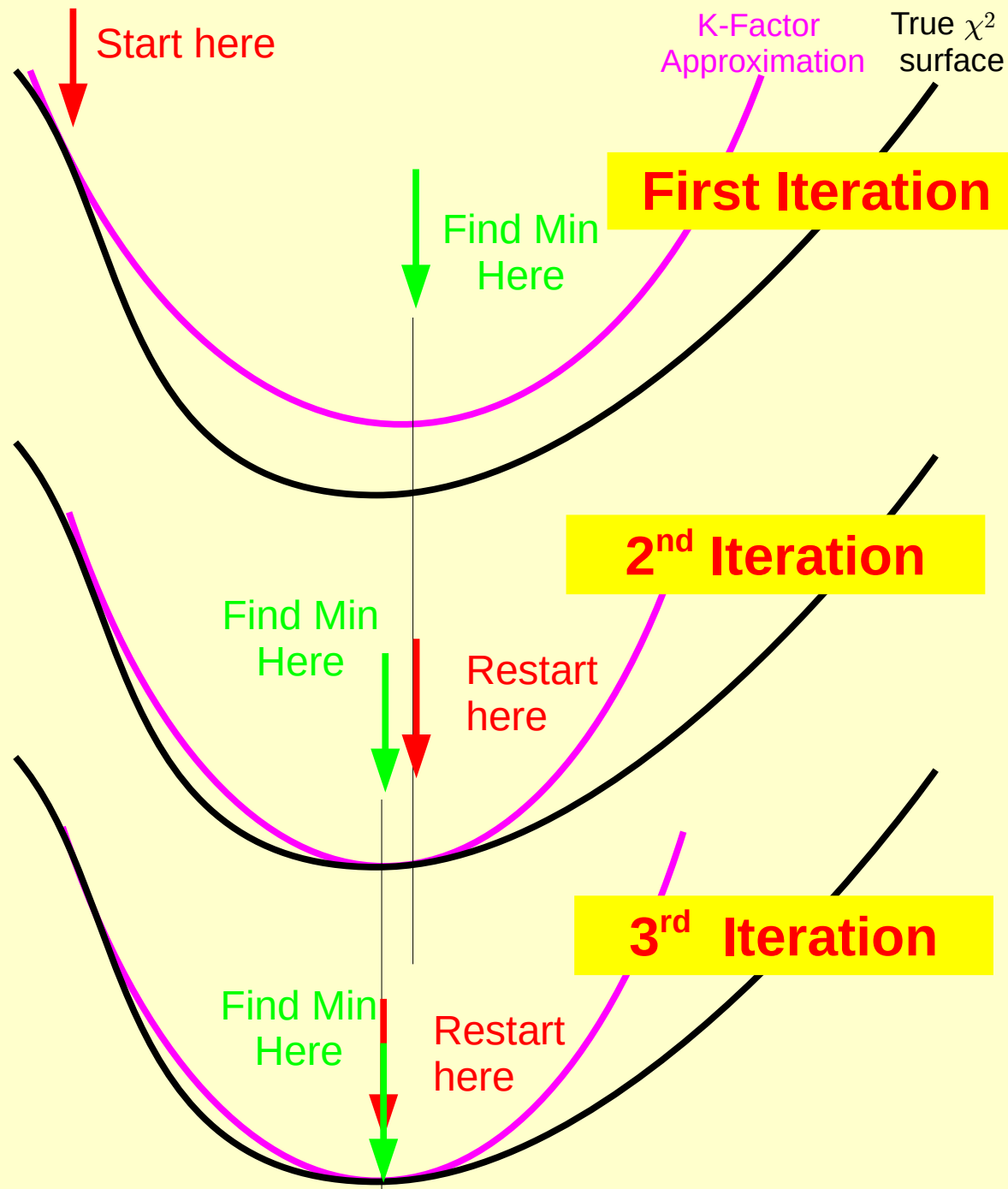
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BACKUP

K-Factor Method



$$K = \frac{\sigma^{FULL}}{\sigma^{Approx}}$$

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- NOTES:
- K-factor yields exact result at starting point.
- K-factor yields accurate result near starting point.
- K-factor yields less accurate result far from starting point.
- Do not change K-factors in middle of fit
- Different σ^{Approx} yield different K-factors, and could yield different path to minimum, but ...
- **Stable minimum should be independent of σ^{Approx}**
- \exists option to skip K-factor method (cross check)

Shift of iterated K-factors
From Voica's study:

First iteration +

2nd Iteration x

3rd Iteration *