Preliminary D/p ratio and F2n/F2p

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- **Yield:**

$$Y^i = \frac{\sum_n N(\text{meausred})^i_n / LT_n \times C_{ECC} \times (1 - \tau^i_{e^+/e^-}) \times C^i_{rad}}{N(\text{charge}) \times N_{\text{targ}}}$$

i: each bin;   n: each run

- Cuts used:
trigger2 = "(DL.evtypebits>>2)&1";
CK = "L.cer.asum_c>2000";
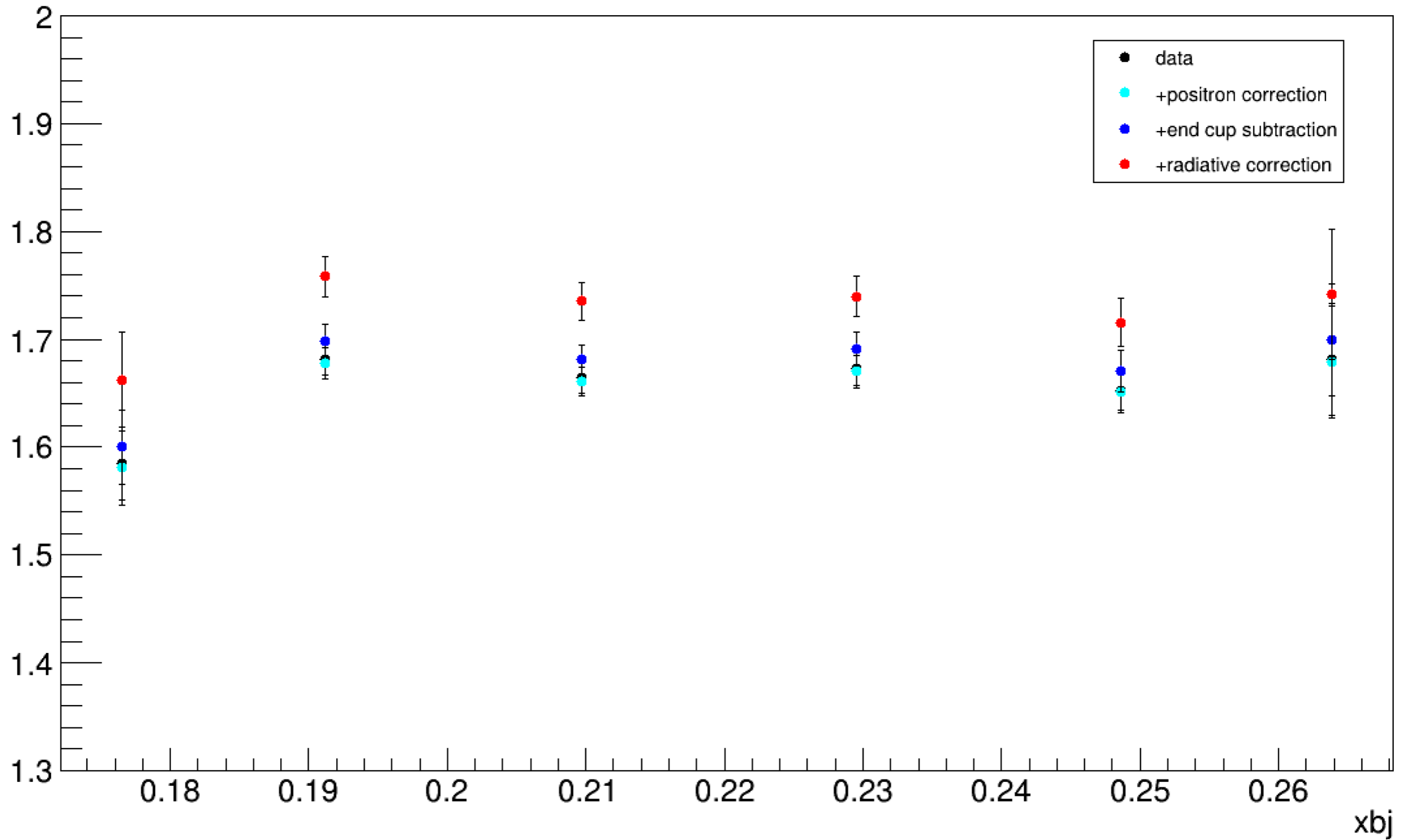E/p = "(L.prl1.e+L.prl2.e)/(1000*L.gold.p)>0.75";
beta = "L.tr.beta>0";
ACC = abs(L.tr.tg_th)<0.06 && abs(L.tr.tg_ph)<0.03 && abs(L.tr.tg_dp)<0.04;
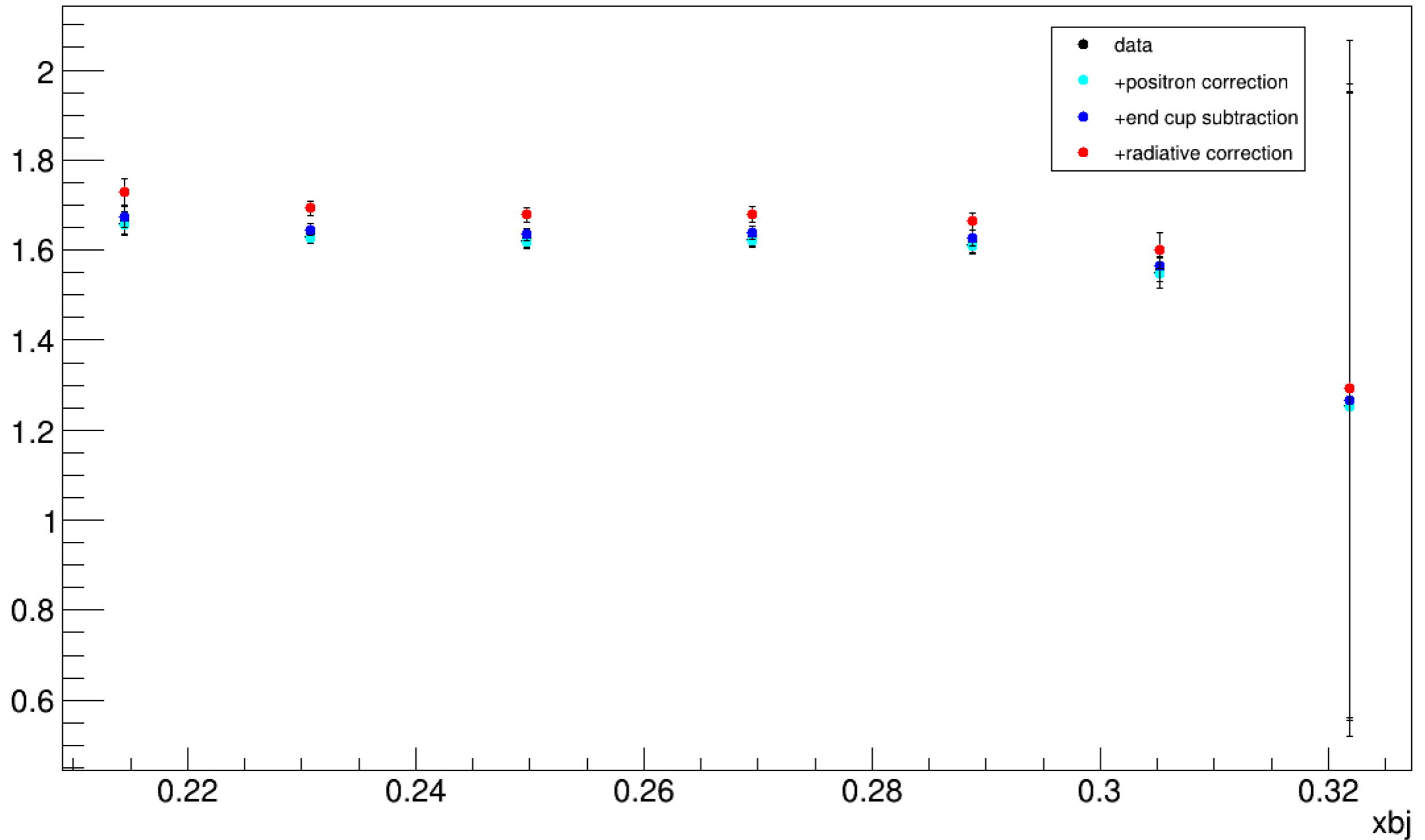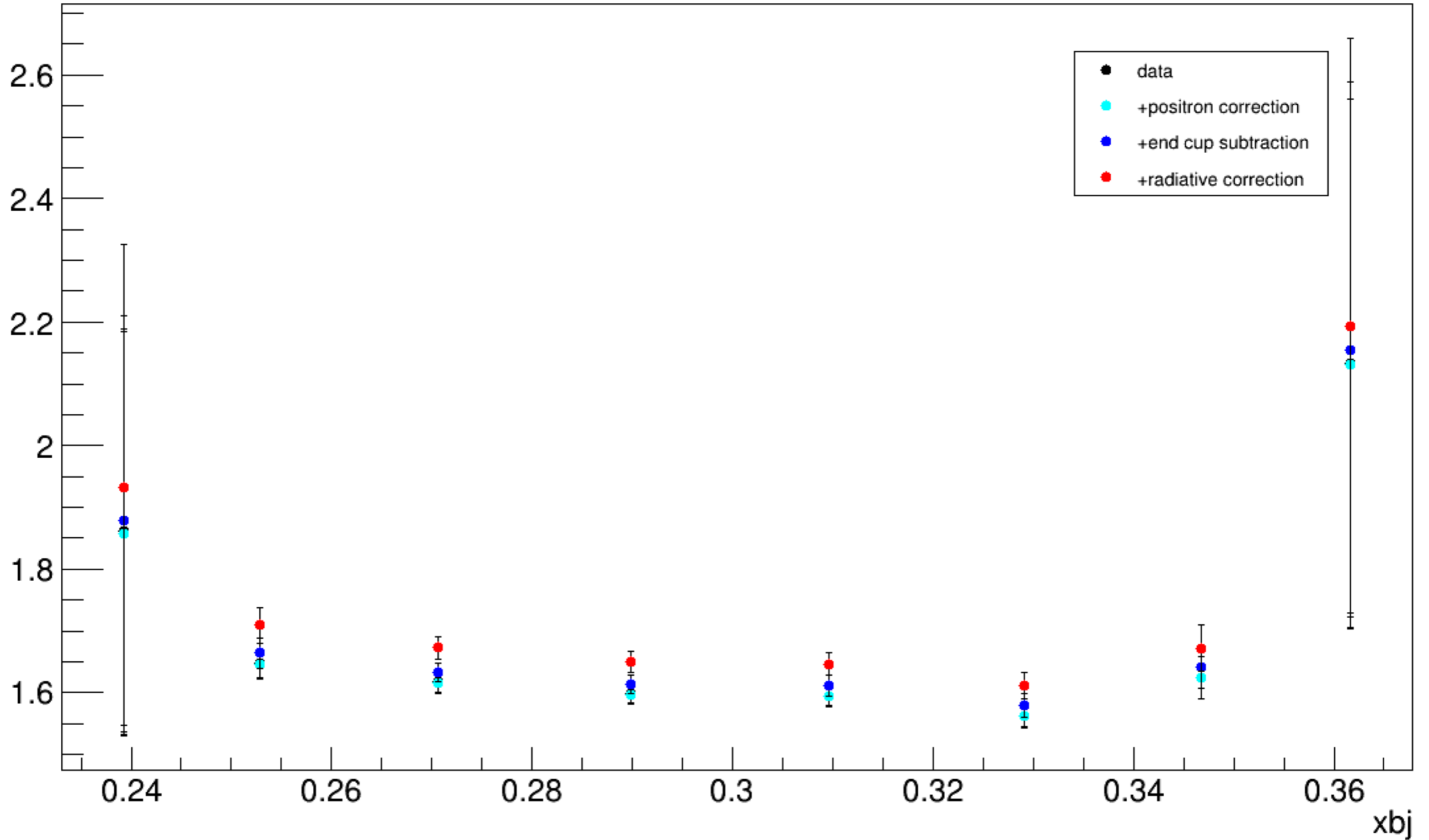VZ = abs(L.tr.vz)<0.07;
TRK1 = "L.tr.n==1";

Kin 1 D2/H1

- data
- +positron correction
- +end cup subtraction
- +radiative correction

2 to 5 points are kept

Kin 2 D2/H1

- data
- +positron correction
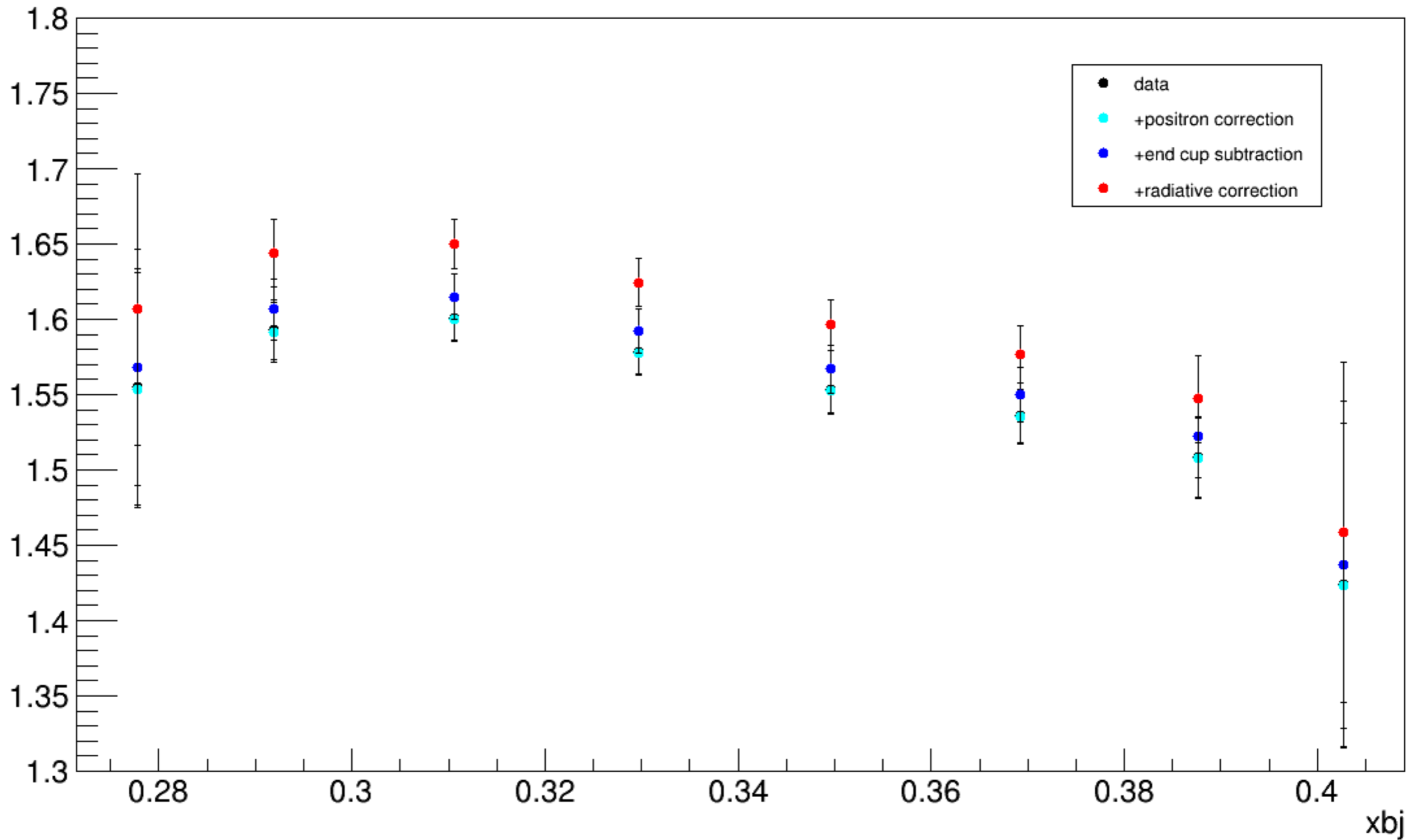- +end cup subtraction
- +radiative correction

1 to 6 points are kept

Kin 3 D2/H1

2 to 7 points are kept

Kin 4 D2/H1

2 to 7 points are kept

D2/H1

MARATHON kin1
MARATHON kin2
MARATHON kin3
MARATHON kin4
SLAC Bodek et al.

VZ = abs(L.tr.vz)<0.07;

D2/H1

MARATHON kin1
MARATHON kin2
MARATHON kin3
MARATHON kin4
SLAC Bodek et al.

VZ = -0.09<L.tr.vz<0.10;

D2/H1

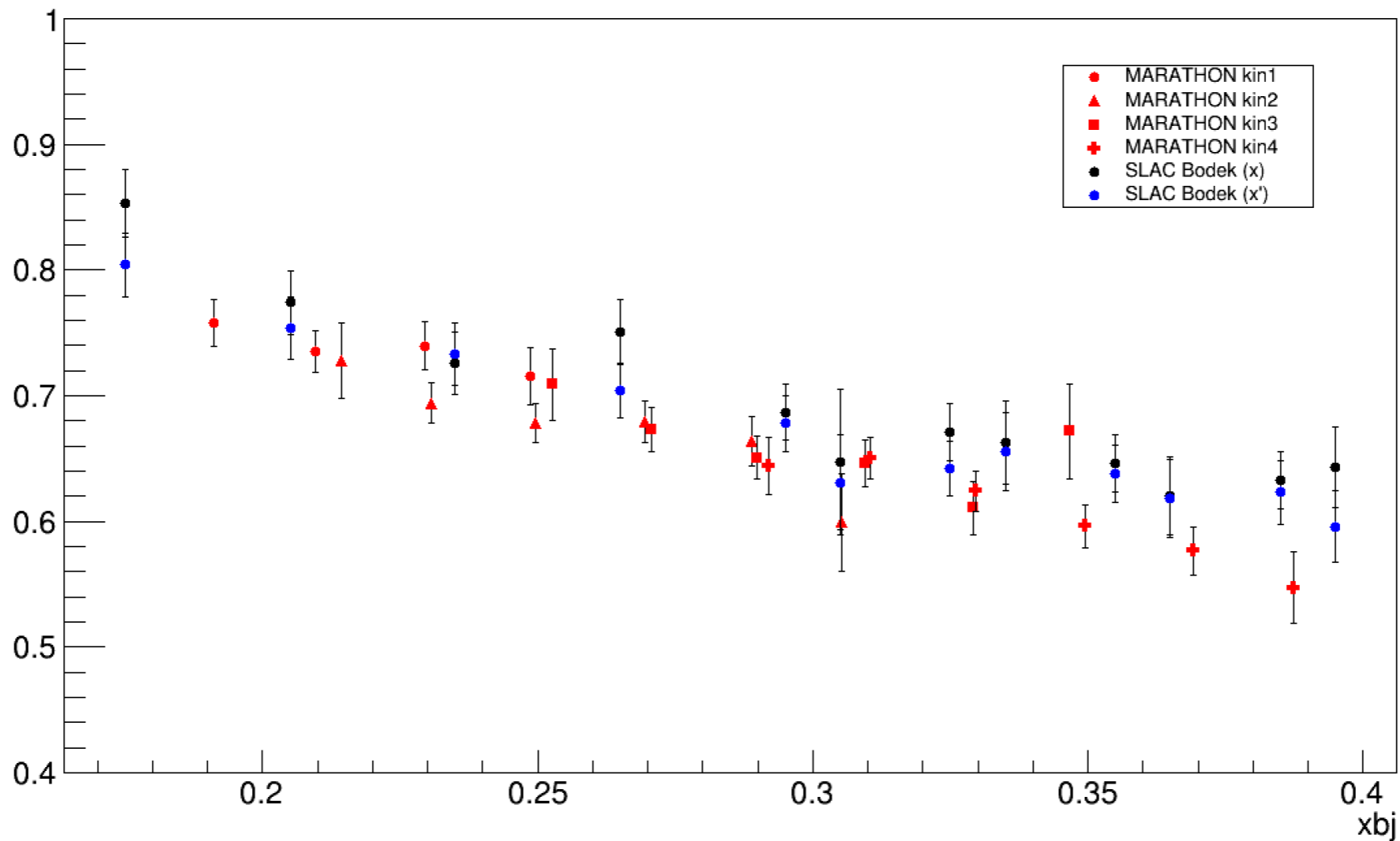MARATHON kin1
MARATHON kin2
MARATHON kin3
MARATHON kin4
SLAC Bodek et al.
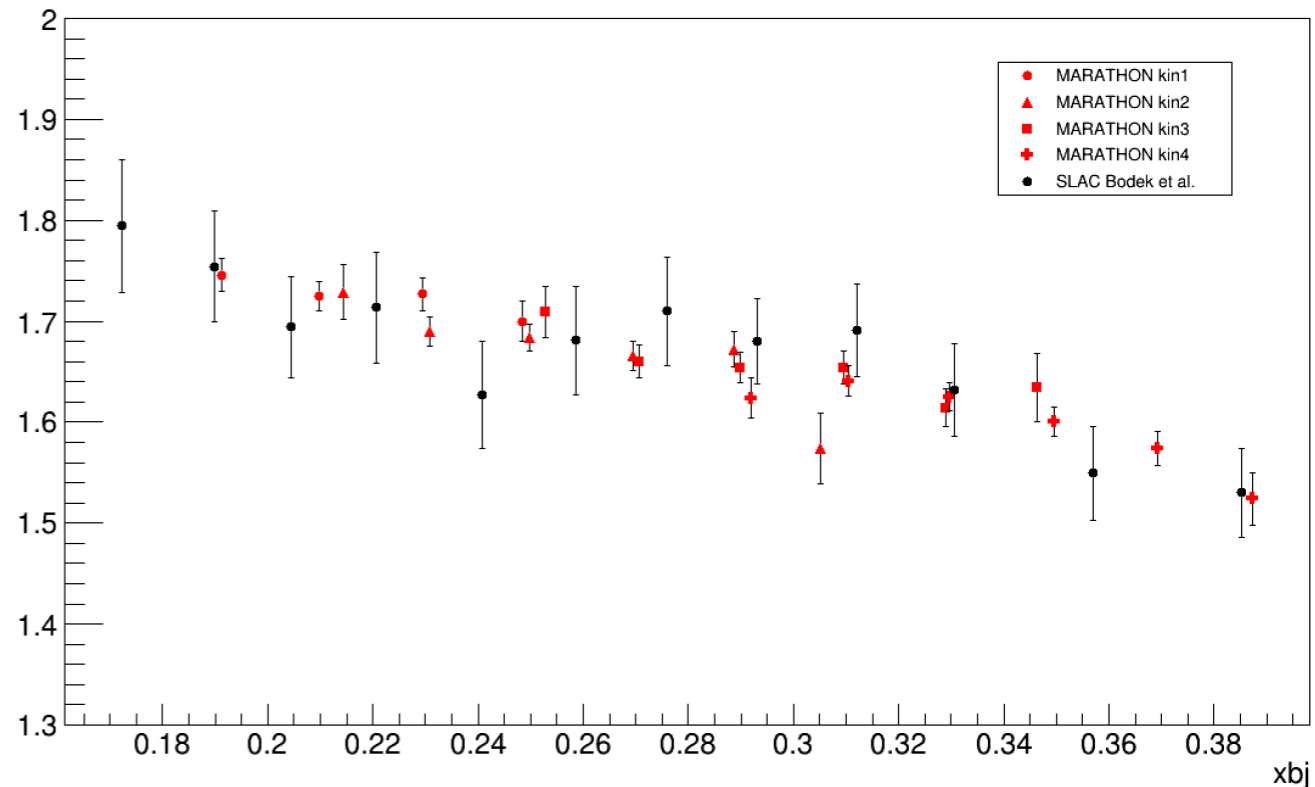
VZ = -0.045<L.tr.vz<0.05;

F2n/F2p

$$\frac{F_2^n}{F_2^p} = \frac{\sigma_d}{\sigma_p} - 1$$

compared with SLAC Bodek table IX and $\frac{\sigma_n}{\sigma_p}$ table X
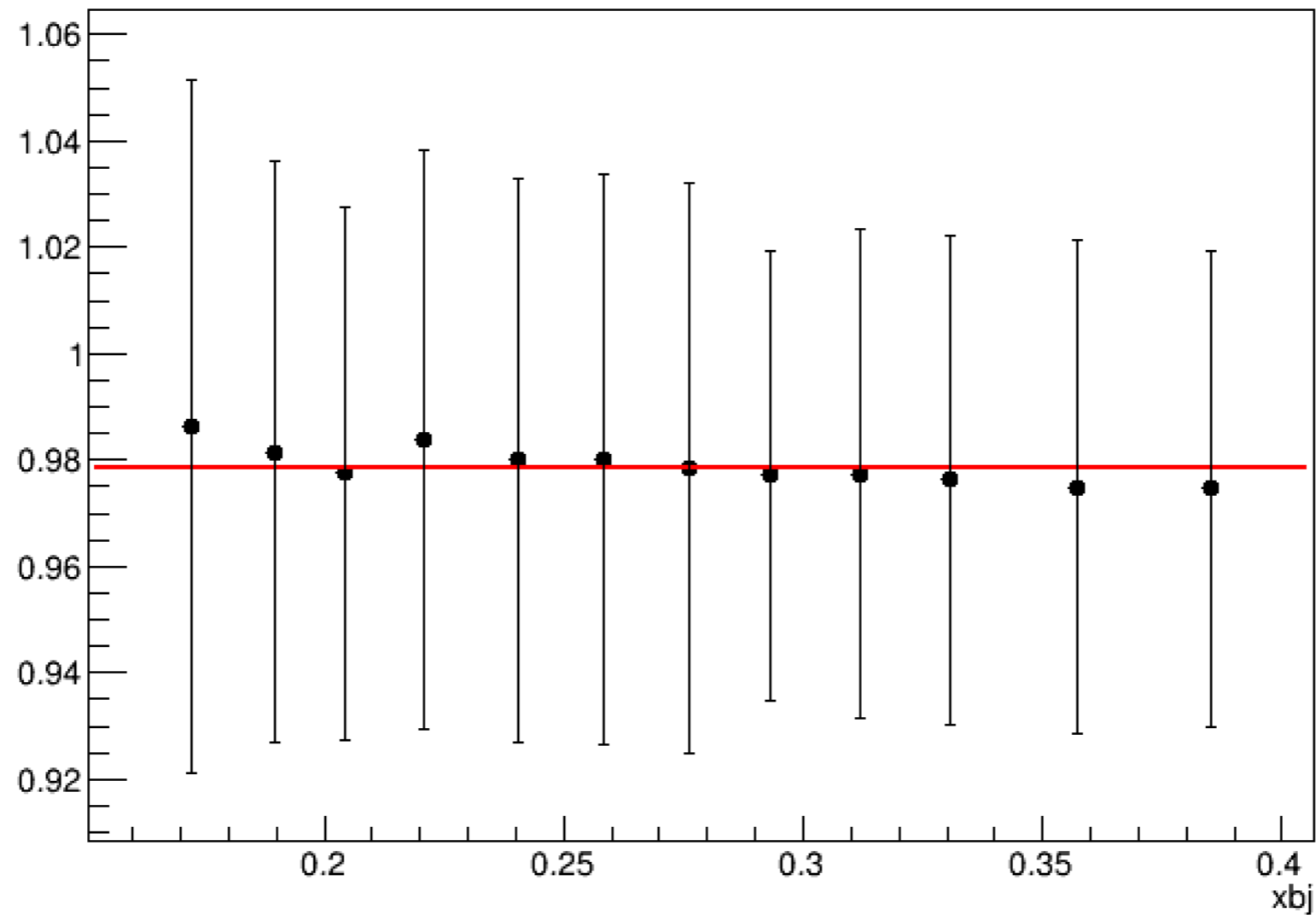

F2n/F2p

VZ = abs(L.tr.vz)<0.07;

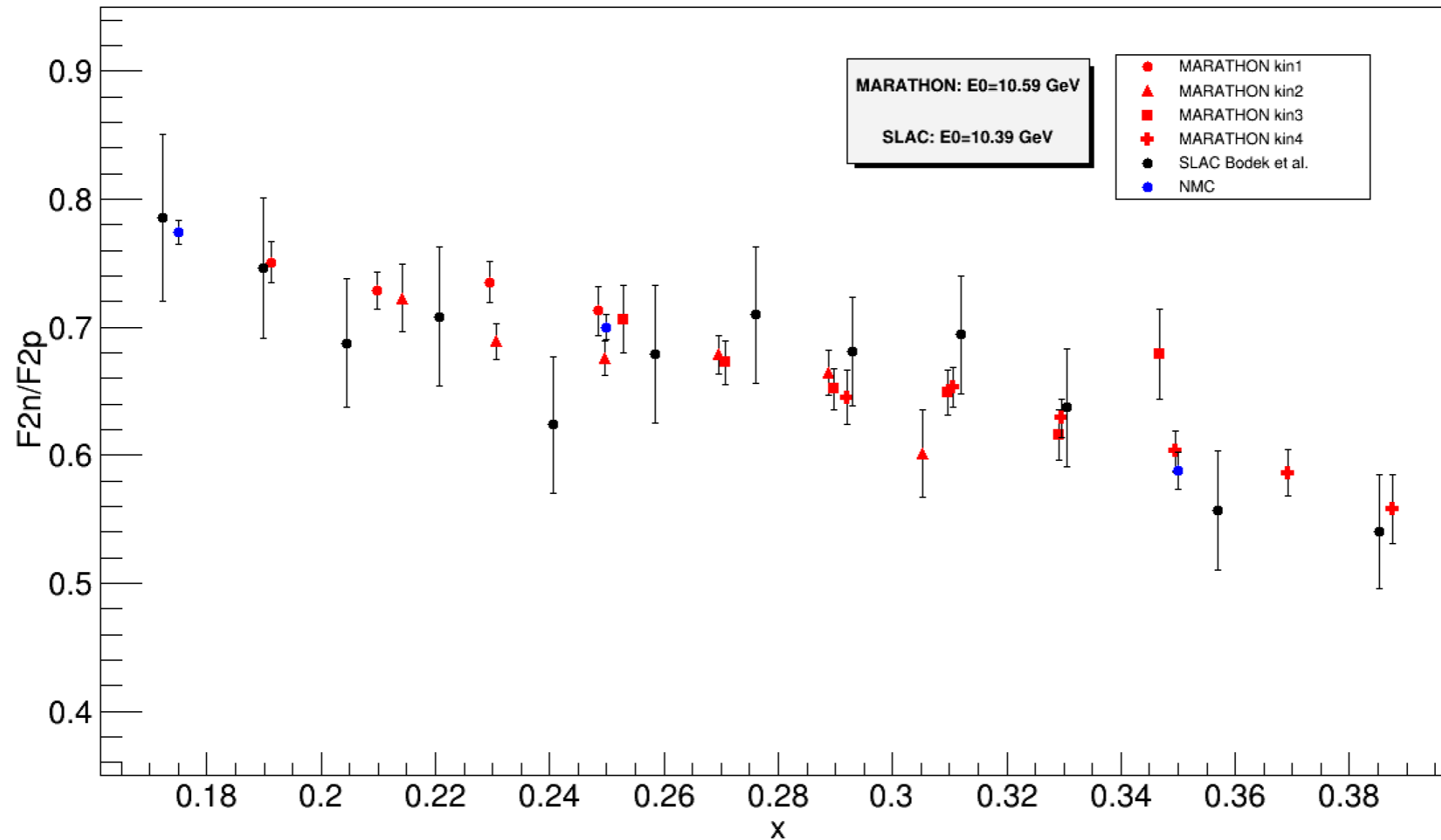- SLAC assumes: $\dfrac{\sigma_n}{\sigma_p} = \dfrac{\sigma_d}{\sigma_p} \times \dfrac{1}{R} - 1$

- if draw $\dfrac{\sigma_d}{\sigma_p + \sigma_n}$ from Bodek's data:

sigma_D/(sigma_p+sigma_n)

- R~0.978

- assume $R = 1.0095 - 0.0109x - 0.0821x^2$ [1], apply to both our data and Bodek's data;
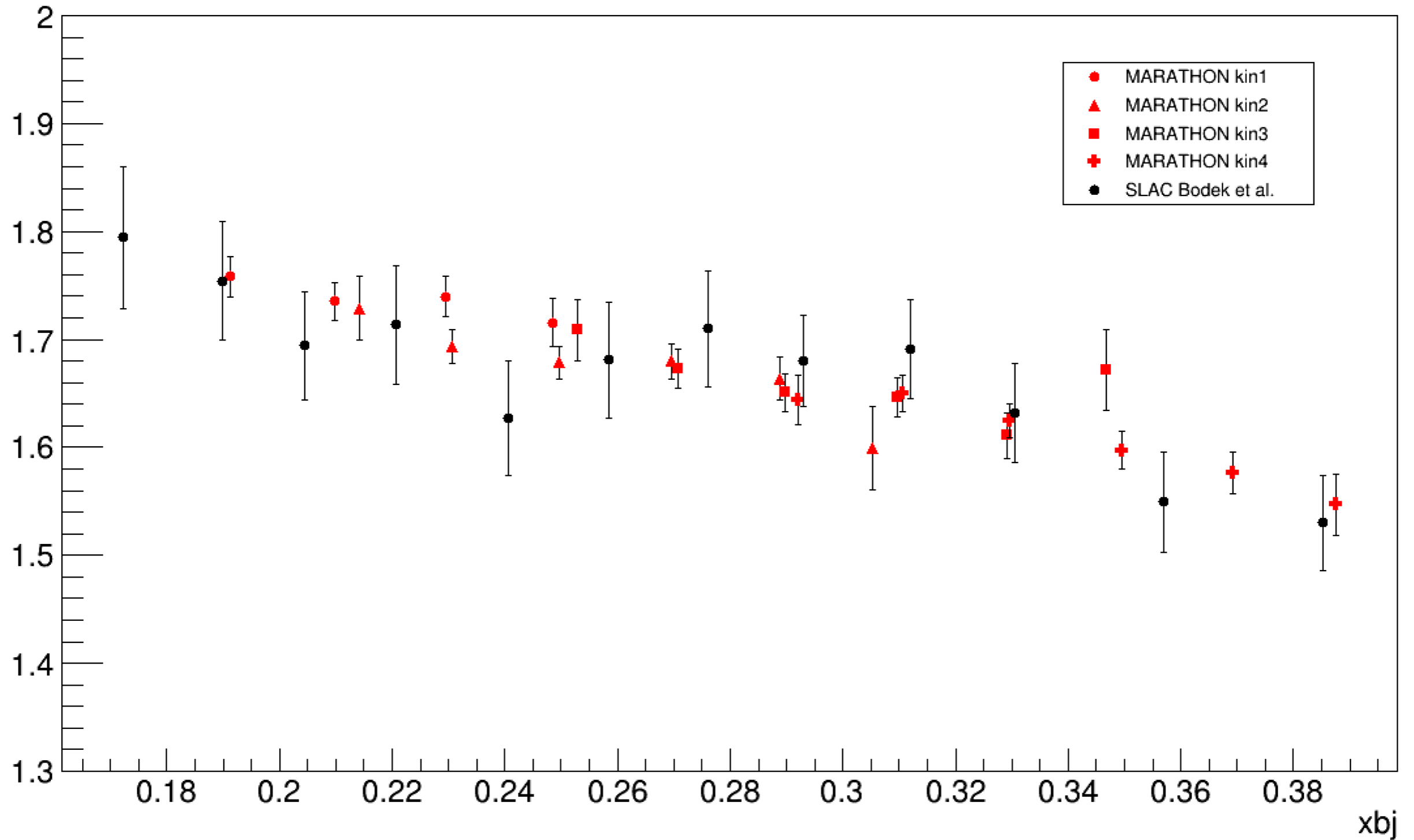- This R fit is valid in x range $(0.15, 0.4)$;

[1] S. A. Kulagin, R. Petti, Phys. Rev. 82C, 054614 (2010); and private communication, 2018.
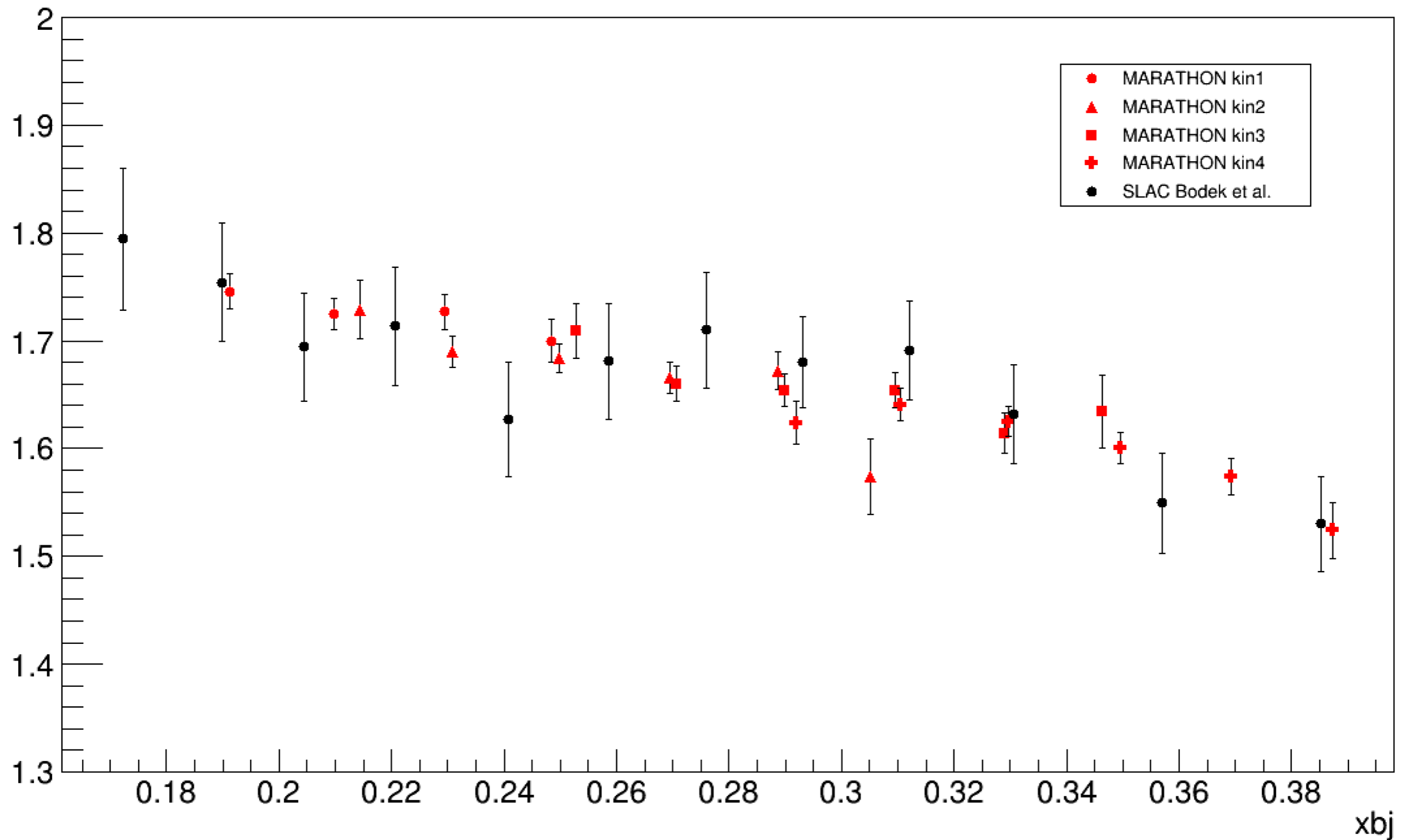
backup

VZ = abs(L.tr.vz)<0.07;

D2/H1

VZ = -0.09<L.tr.vz<0.10;

D2/H1

MARATHON kin1
MARATHON kin2
MARATHON kin3
MARATHON kin4
SLAC Bodek et al.

xbj

VZ = -0.045<L.tr.vz<0.05;

D2/H1