



F2D4 with VFPS



Tomas Hreus,
Laurent Favart, IIHE ULB/VUB Brussels
Robert Roosen

Overview

- ❑ *xpom*, *t* from VFPS global track (acceptances, resolutions)
- ❑ F2D3 using new *xpom*
- ❑ F2D4, *B*-slope

Event selection & Kinematics

Event Selection

scattered electron energy	> 10 GeV
reconstructed vertex	+/- 30 cm
VFPS trigger	either of VFPS stations
VFPS tracks	either of VFPS stations

Kinematics

$$y = y_{el}^2 + y_{da}(1 - y_{da})$$

$$Q^2 = 4E^2(1 - y)/\tan^2(\theta_{e'}/2)$$

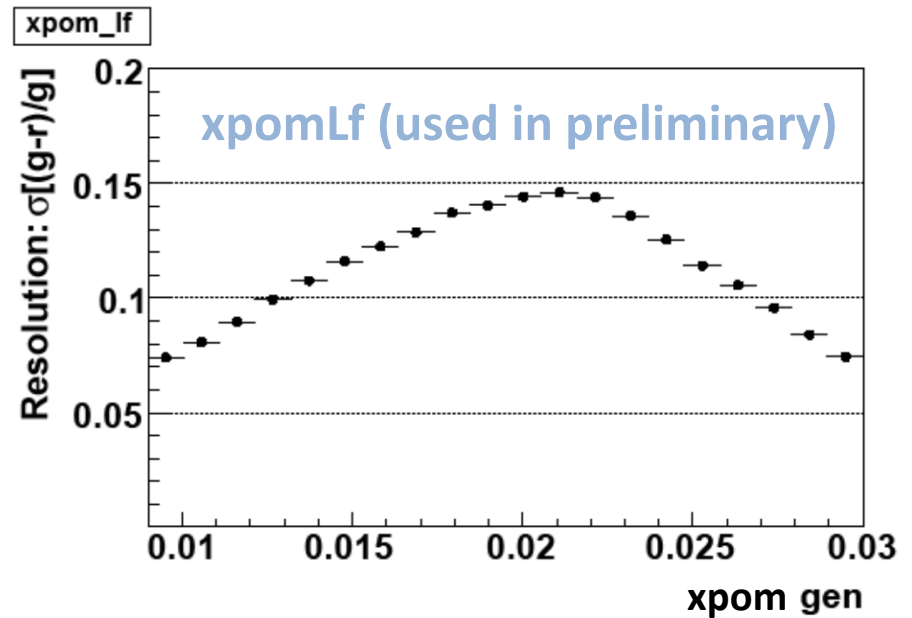
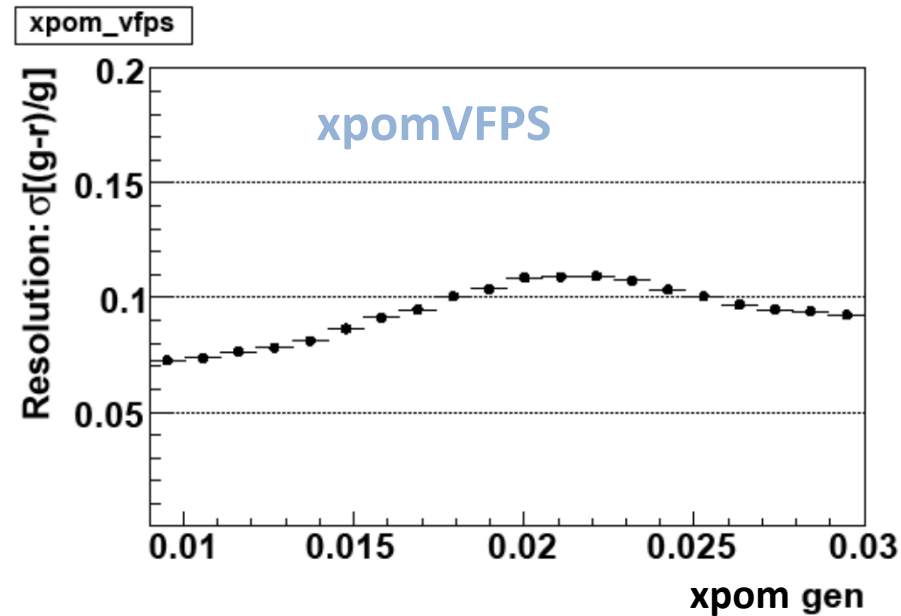
$$x_{IP} = \text{from VFPS global track}$$

$$\beta = x/x_{IP}$$

$$y > 0.01$$

$$\begin{aligned} 4.5 &< Q^2 < 100 \text{ GeV}^2 \\ 0.008 &< \beta < 1 \\ 0.009 &< x_{IP} < 0.026 \end{aligned}$$

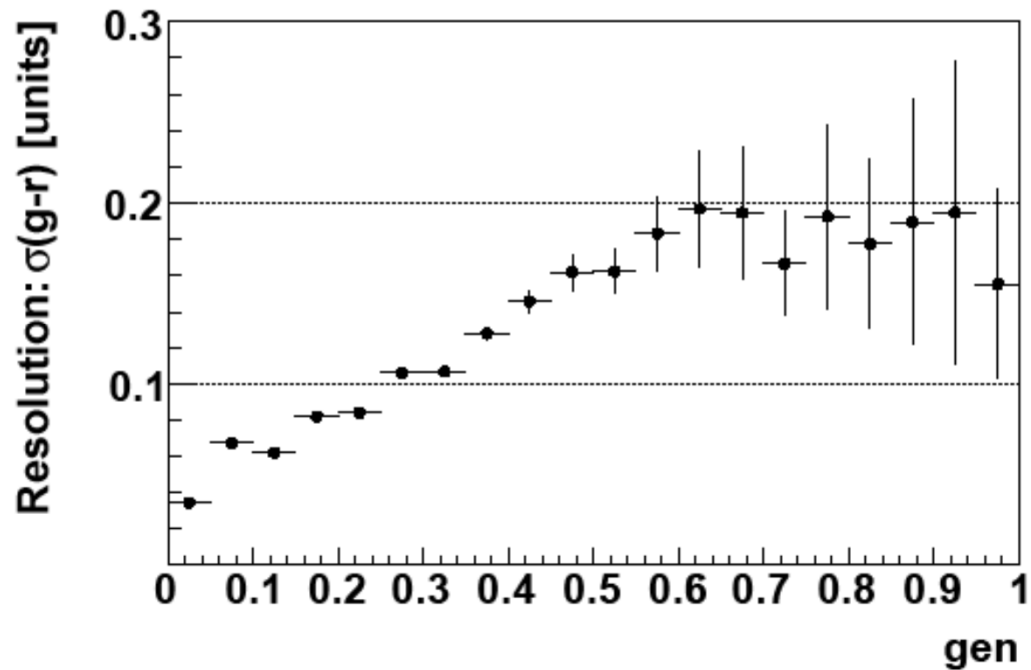
xpom: resolution



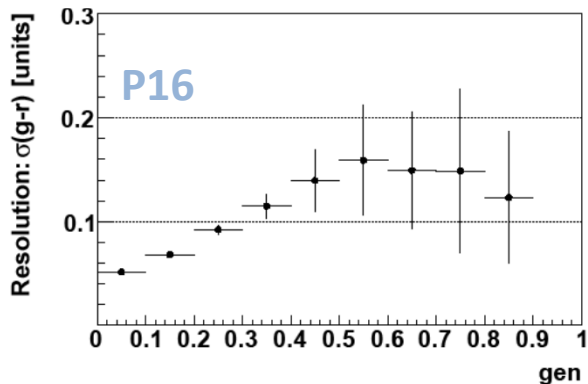
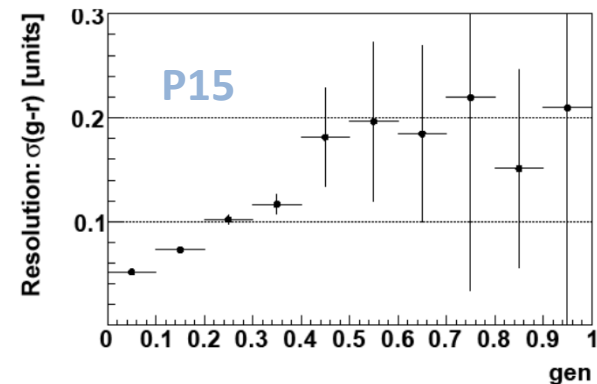
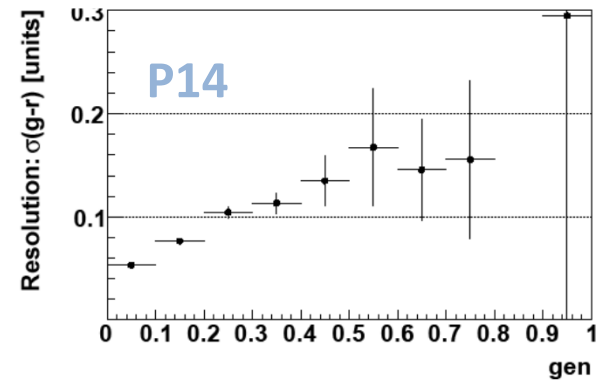
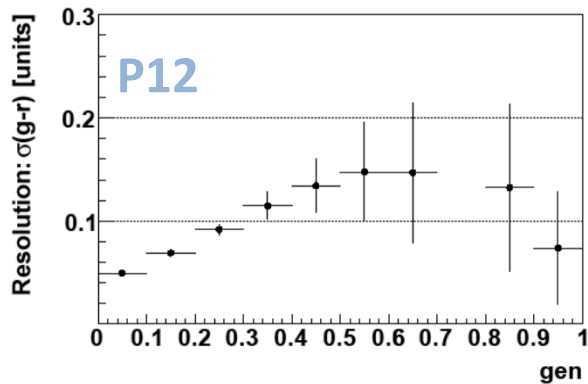
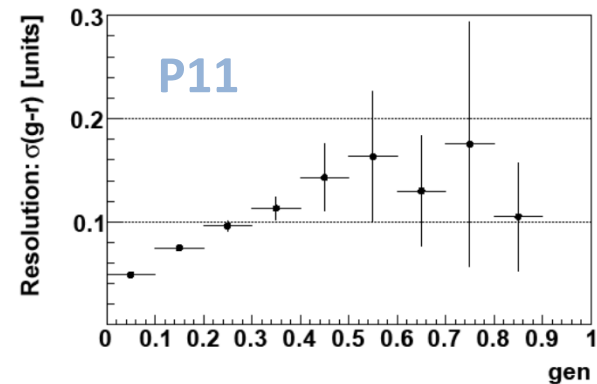
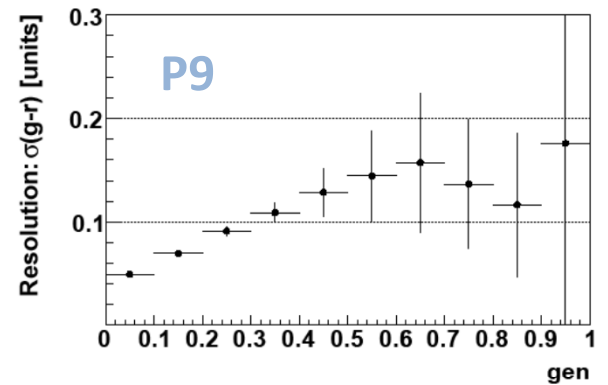
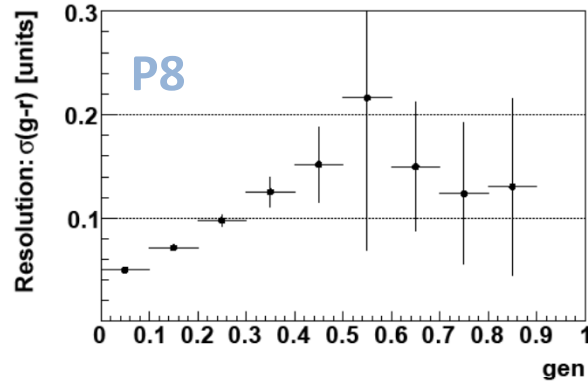
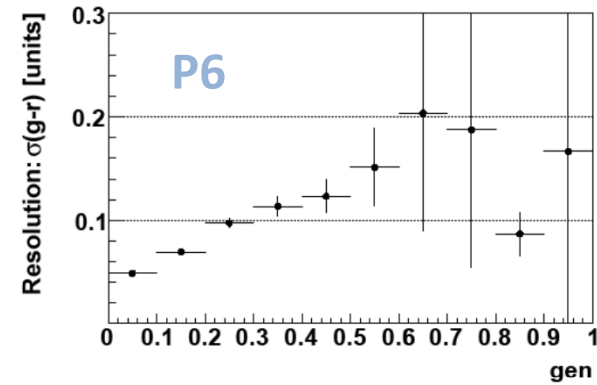
- xpomLf uses VFPS1/2 local track position
- xpomVFPS uses global track position and angles
- resolution below 11% (15% for xpomLf)

t : resolution (I)

- Absolute resolution is between 0.05 – 0.2 GeV²



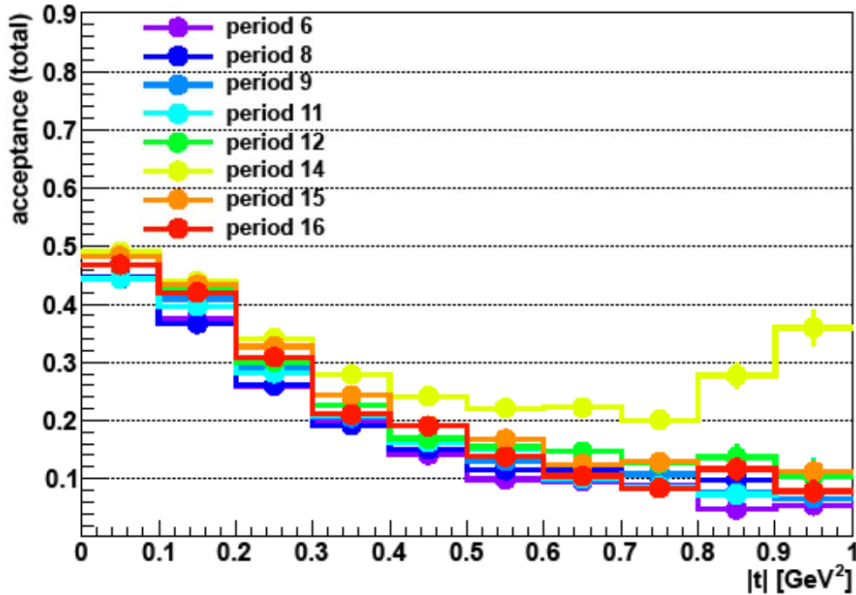
t : resolution (II)



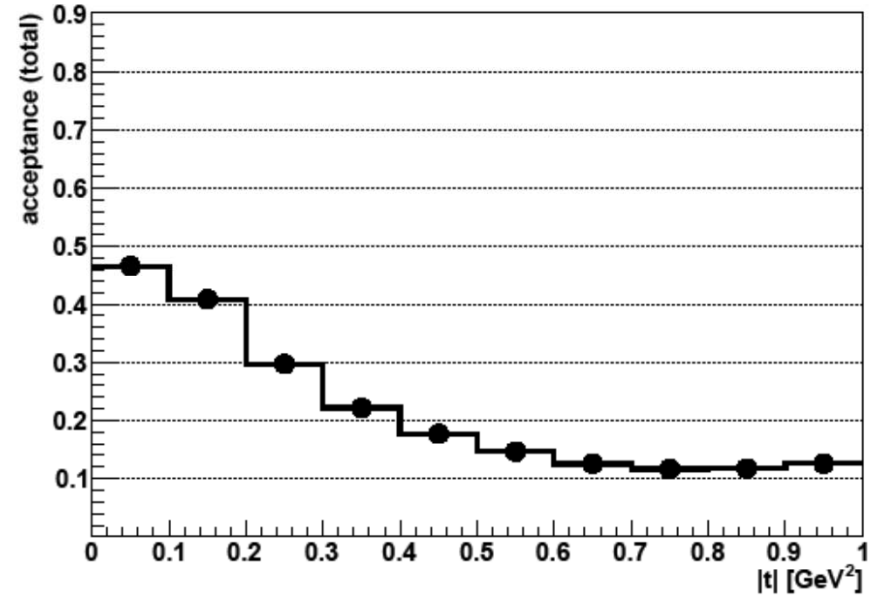
➤ stable in periods
(2006/07 e+)

t : acceptance

separately for each period



combined for all periods (2006/07 e+)

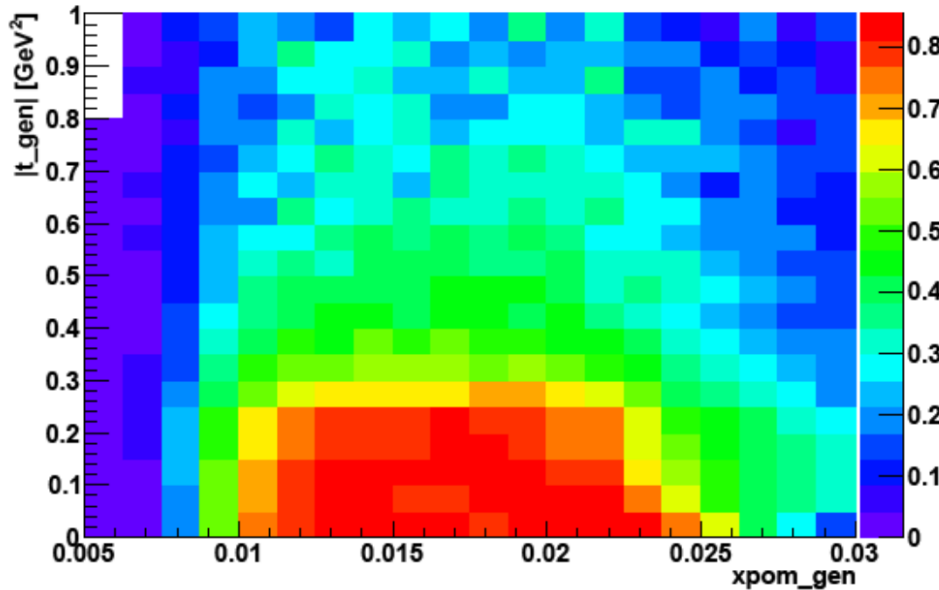


- acceptance stable in periods
- low acceptance for $|t| > 0.5$ GeV²

$xpom, t$: acceptance

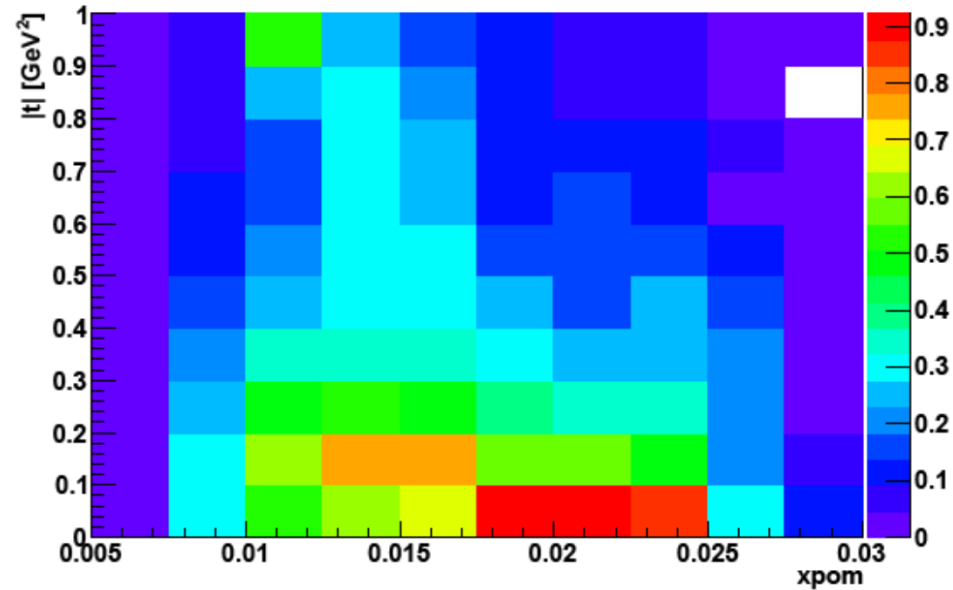
xpom-t acceptance (geometric)

20x20 bins



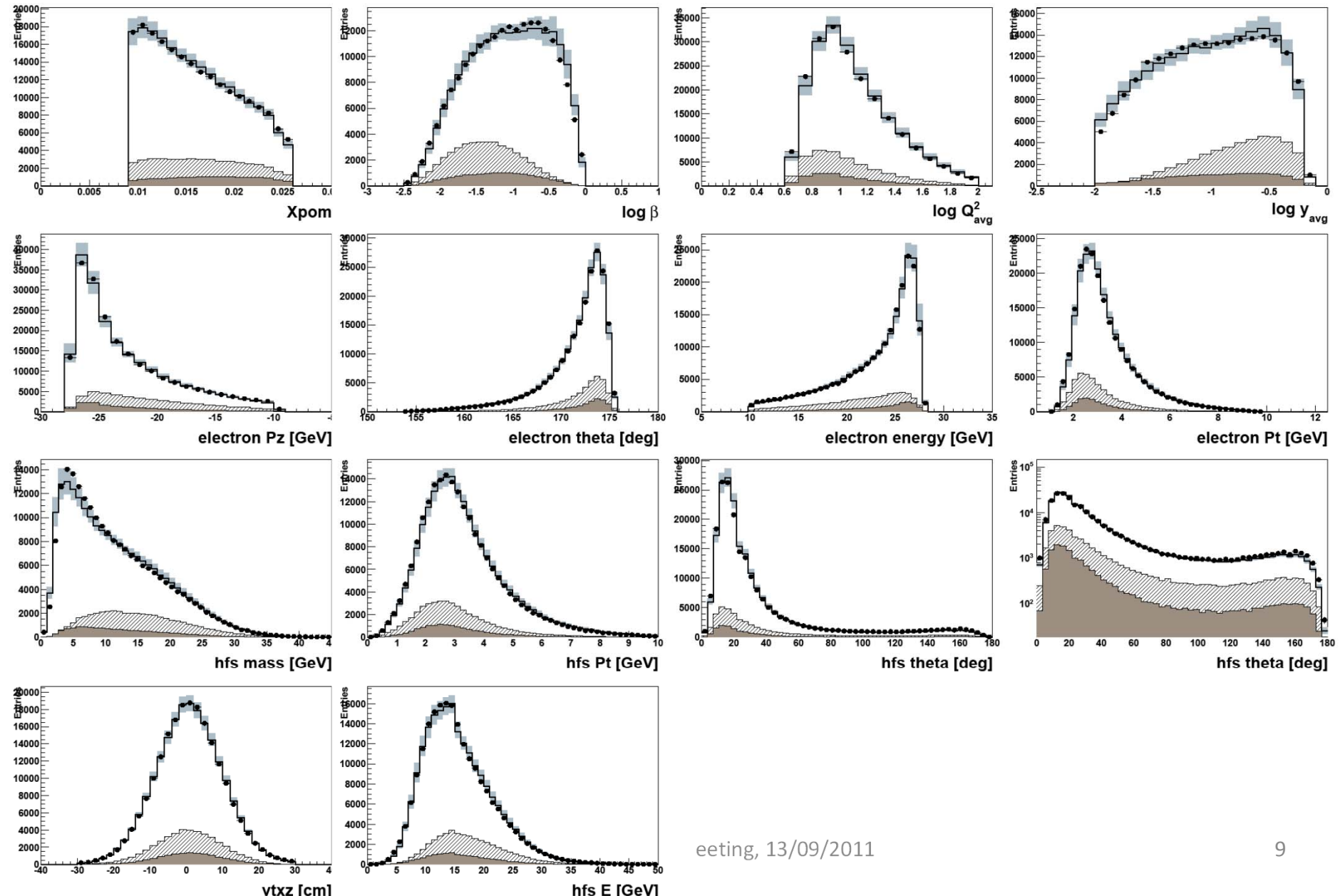
xpom-t acceptance (total)

10x10 bins

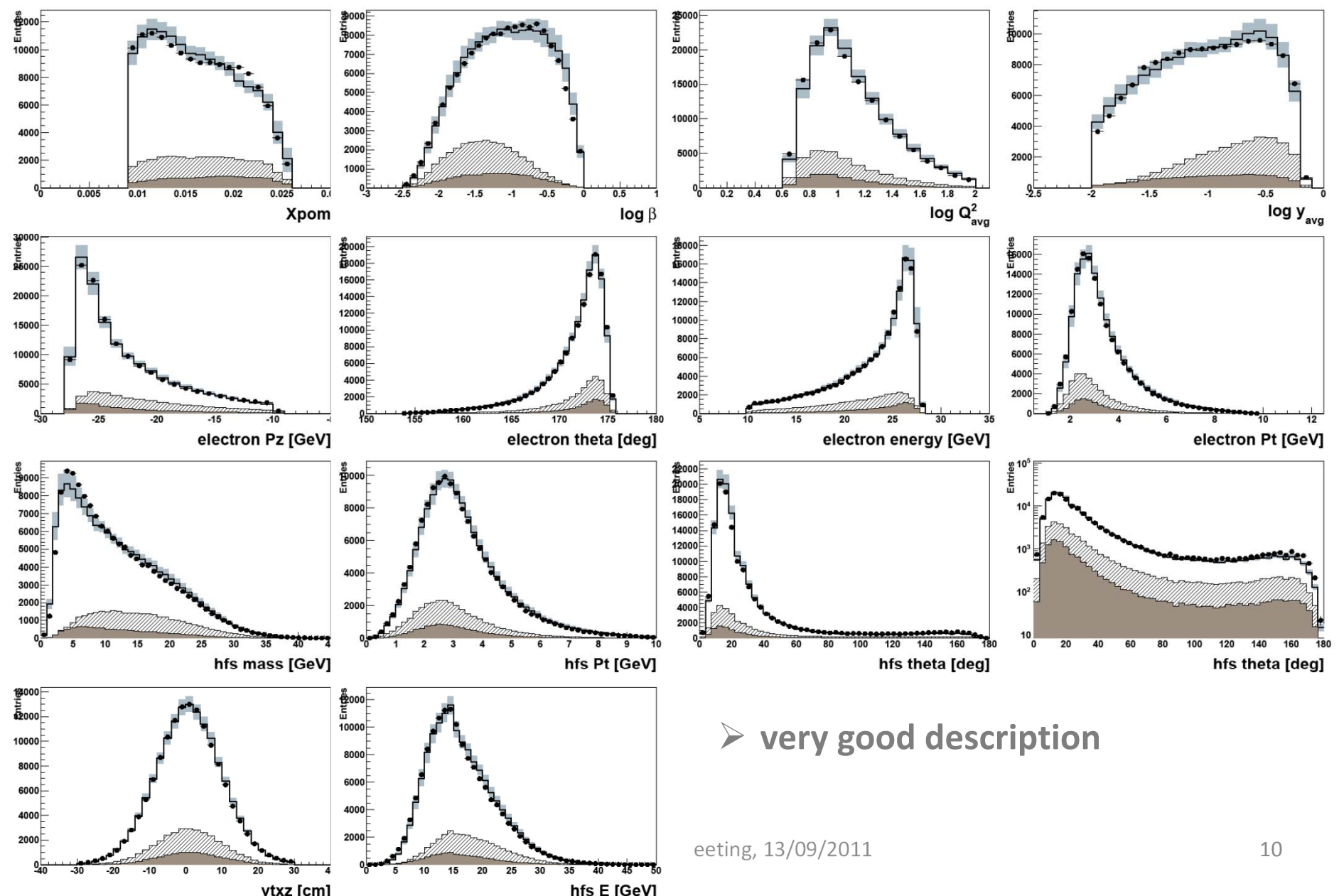


- geometric acc highest between $xpom$ (0.01 – 0.022) and $|t|$ (0 – 0.25) GeV²
- with smearing and track efficiencies acc drops significantly
- $|t| < 0.5$ GeV² used for the F2D4 analysis

Control plots (local VFPS tracks)



Control plots (global VFPS track)

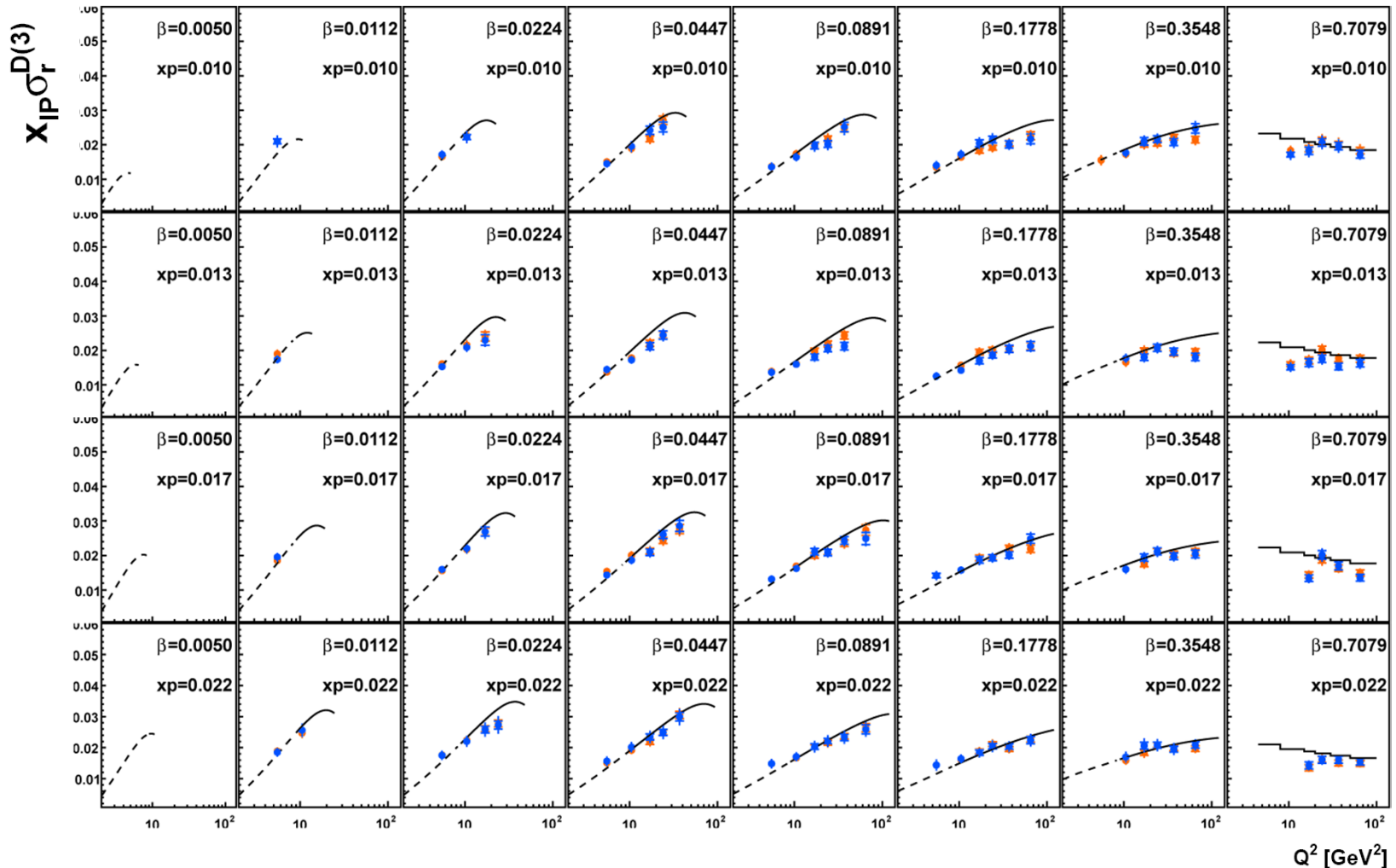


rCS as $f(\beta)$

- VFPS (local tracks)
- VFPS (global track)

➤ difference within 1 sigma

— H1 2006 DPDF Fit B x 0.81
 - - - H1 2006 DPDF Fit B x 0.81 (extrapol.)



F2D4

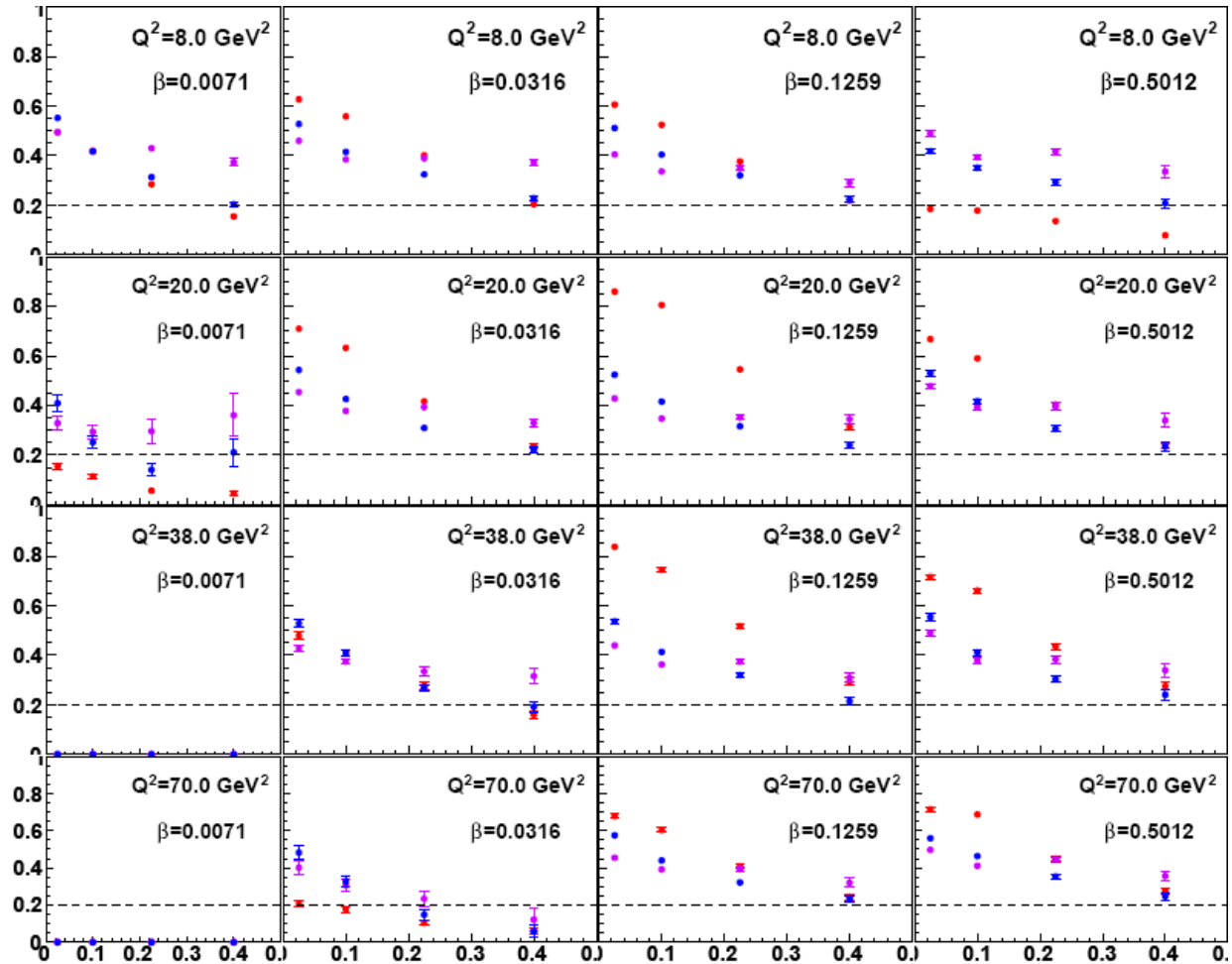
Beta, q2 rebinned: 4 bins each

4 bins in |t|

xpom > 0.012

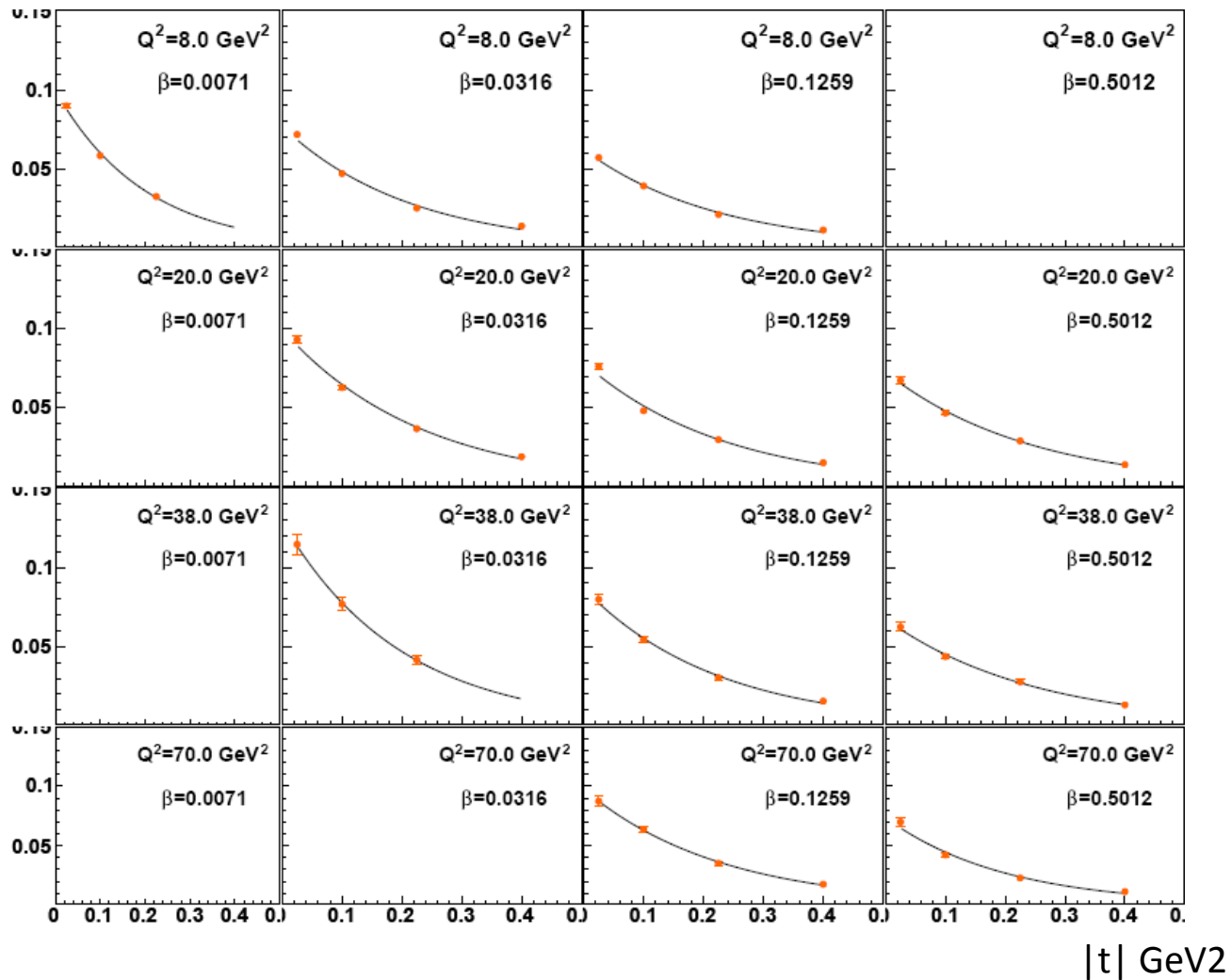
F2D4: acceptances

- Acceptance
- Purity
- Stability

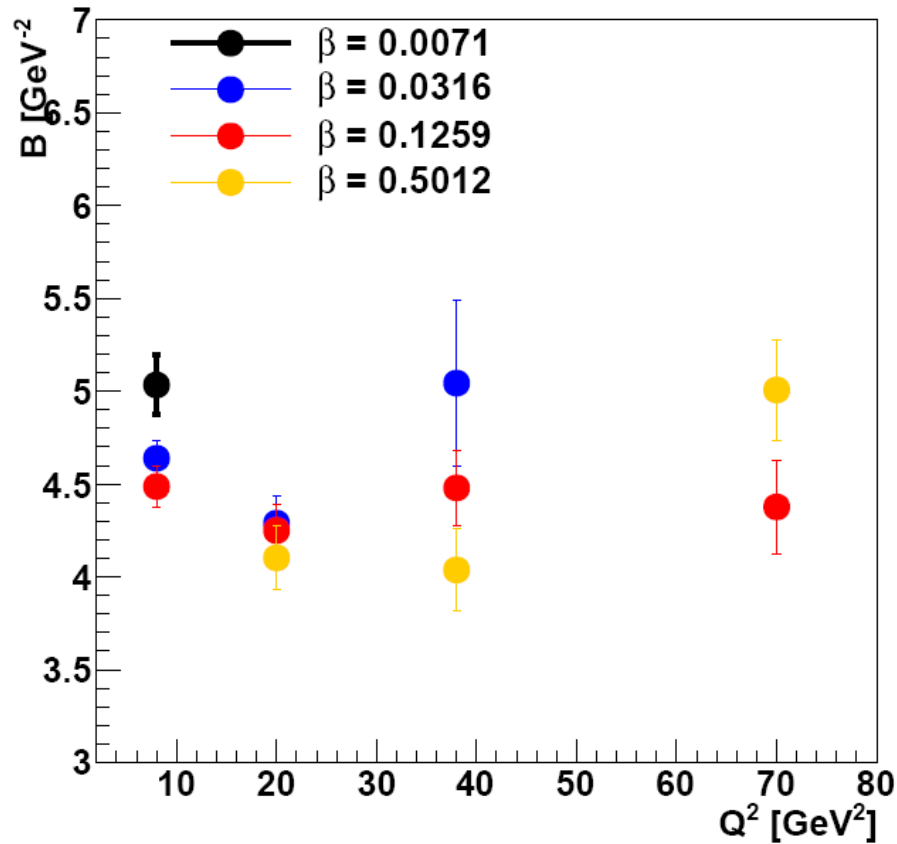


F2D4: rCS

- VFPS (global track)
- fit: $N * \exp(-B * |t|)$



F2D4: B-slope



➤ B slopes between 4 – 5 GeV⁻²