**Electron Scattering at very low Q2**

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The ep cross section at very low q2 is expressed as the photon cross section (virtual, considered real, and therefore, keeping only the transversal component) times *a virtual photon flux*.

$$d^2\sigma_T(ep) = \sigma_T(\gamma p) d^2F$$

The virtual photon flux is expressed (by its kinematical dependences) as:

$$d^2F = \frac{\alpha}{2\pi}\frac{1+(1-y)^2}{yQ^2}dydQ^2$$

where

$$\upsilon = E - E' \;;\quad y = \frac{\upsilon}{E}$$

$$Q^2 \approx EE'\theta^2$$

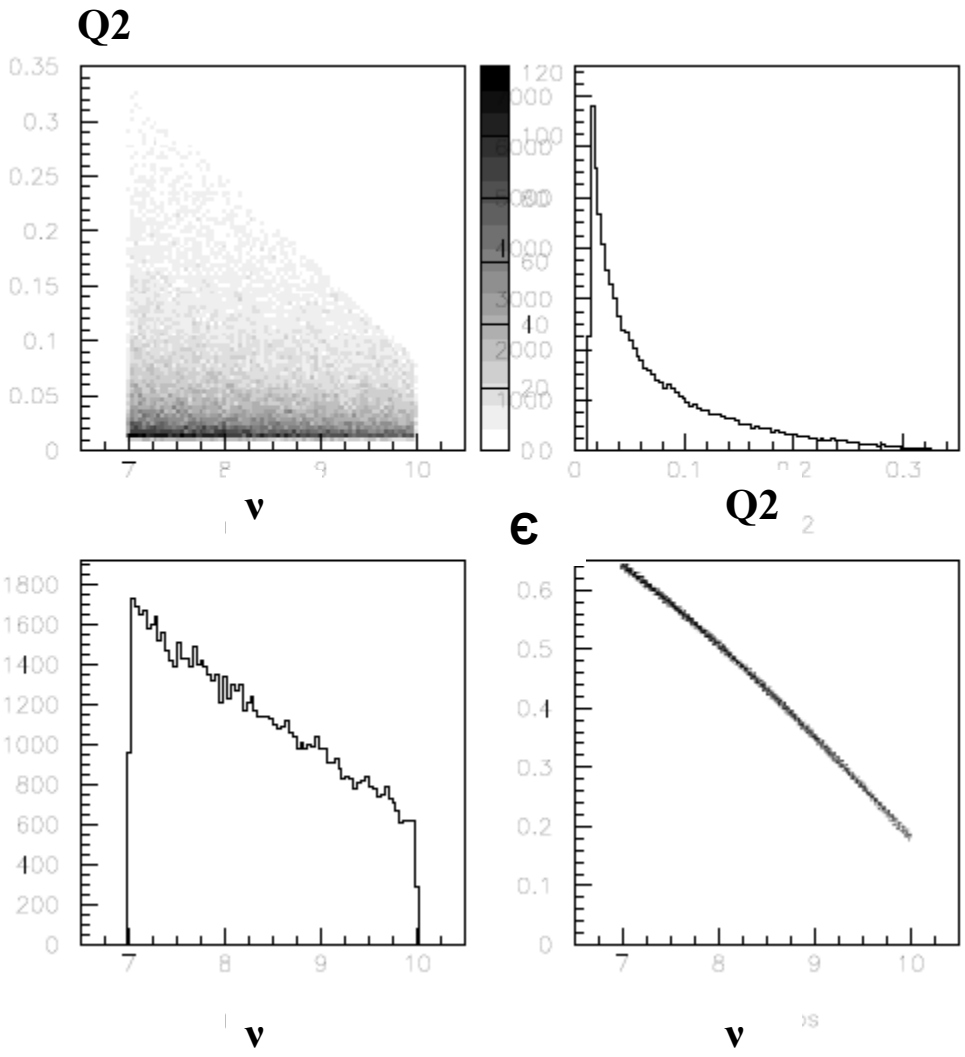
The photon polarization is given by:

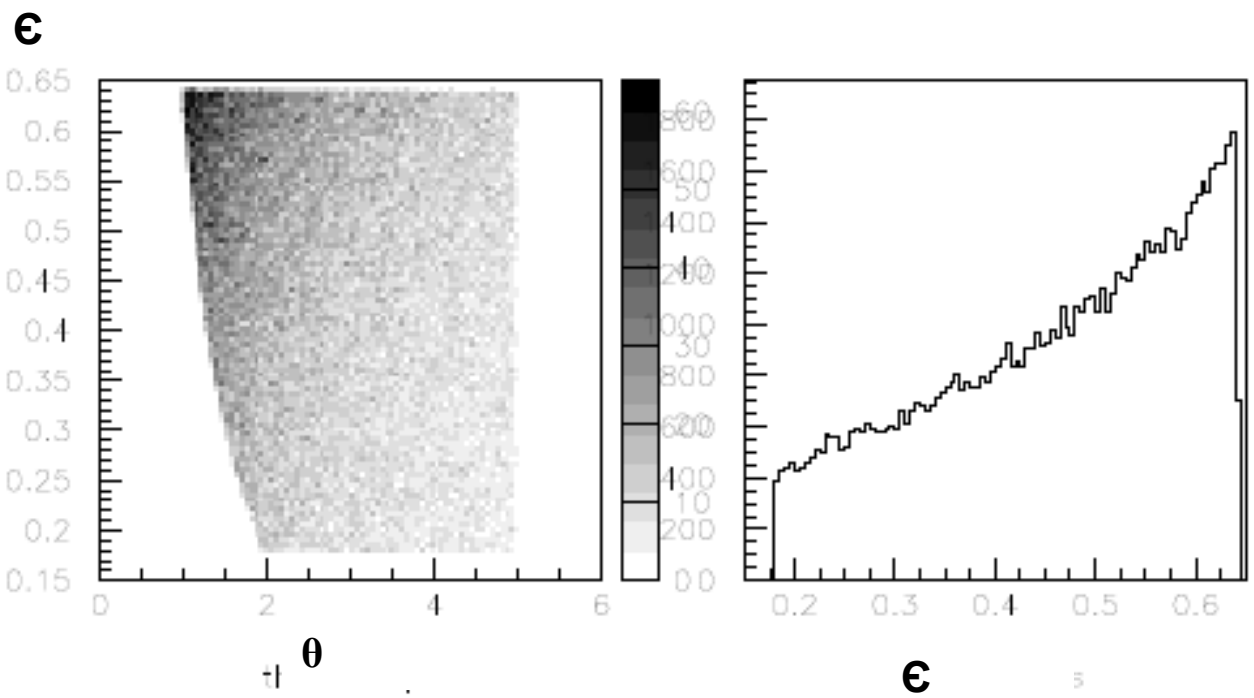
$$\varepsilon \cong \left\{1 + \frac{(Q^2+\nu^2)}{2Q^2}\theta^2\right\}^{-1}$$

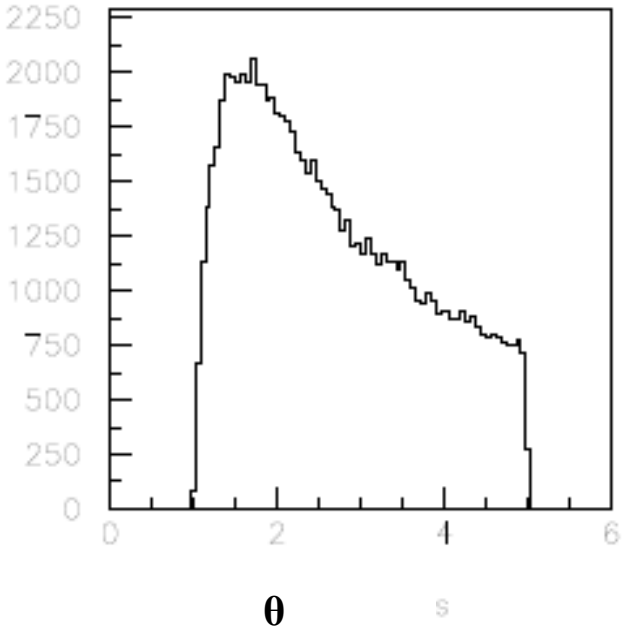
Therefore, the kinematics dependence is only though: $E';\theta$
φ is used to crate the four-momentum and it is produced with a flat distribution between (0,2π). Values were taken in the ranges: 1 GeV < E' <4 GeV, 1 < θ < 5 degrees and 0 < Φ <360 degress.

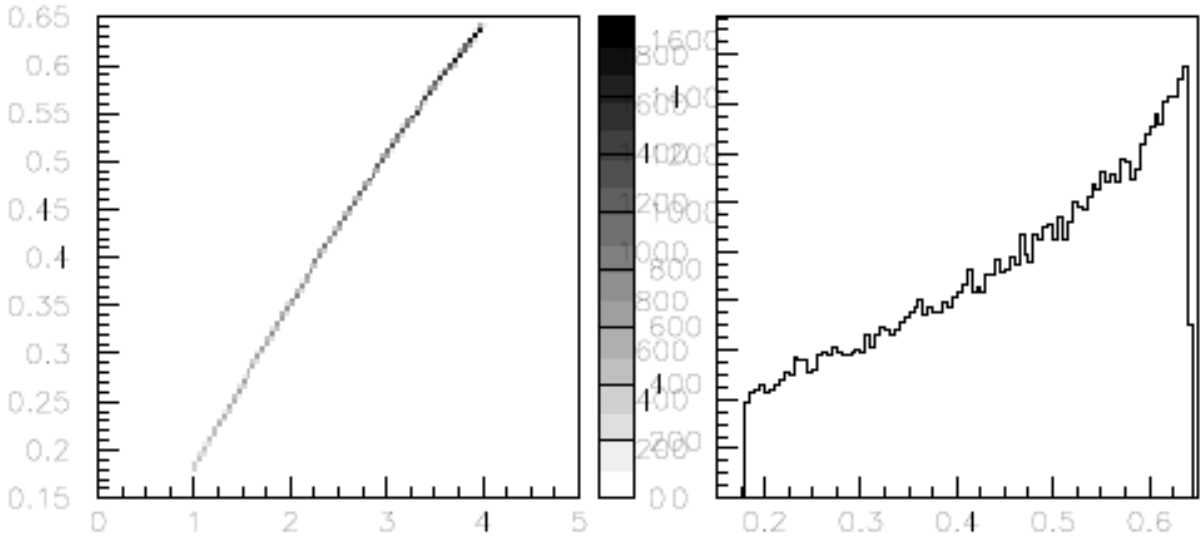
A flux of virtual photons [including each photon's four momentum and polarization (Є)] was generated to be included as input to our current simulation of real photon cross sections and angular distribution of hadronic production from the proton.

The following plots show some kinematical distributions of these generated virtual photons.

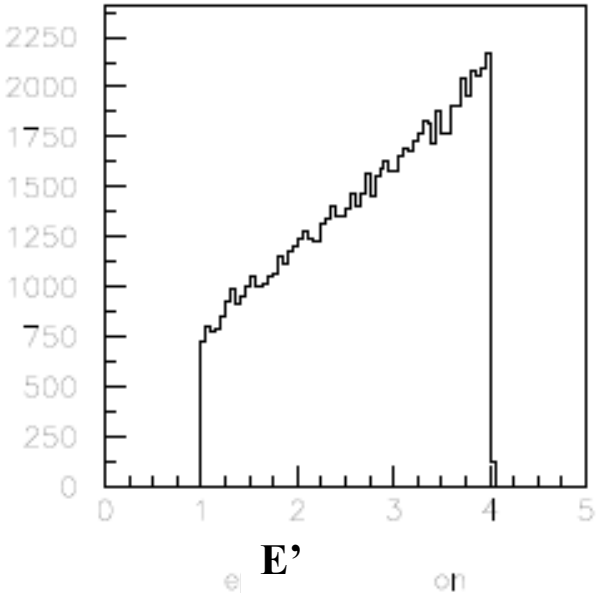



ϵ
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0
2
4
6
θ
0.2
0.3
0.4
0.5
0.6
ϵ


2250
2000
1750
1500
1250
1000
750
500
250
0
0
2
4
6
θ

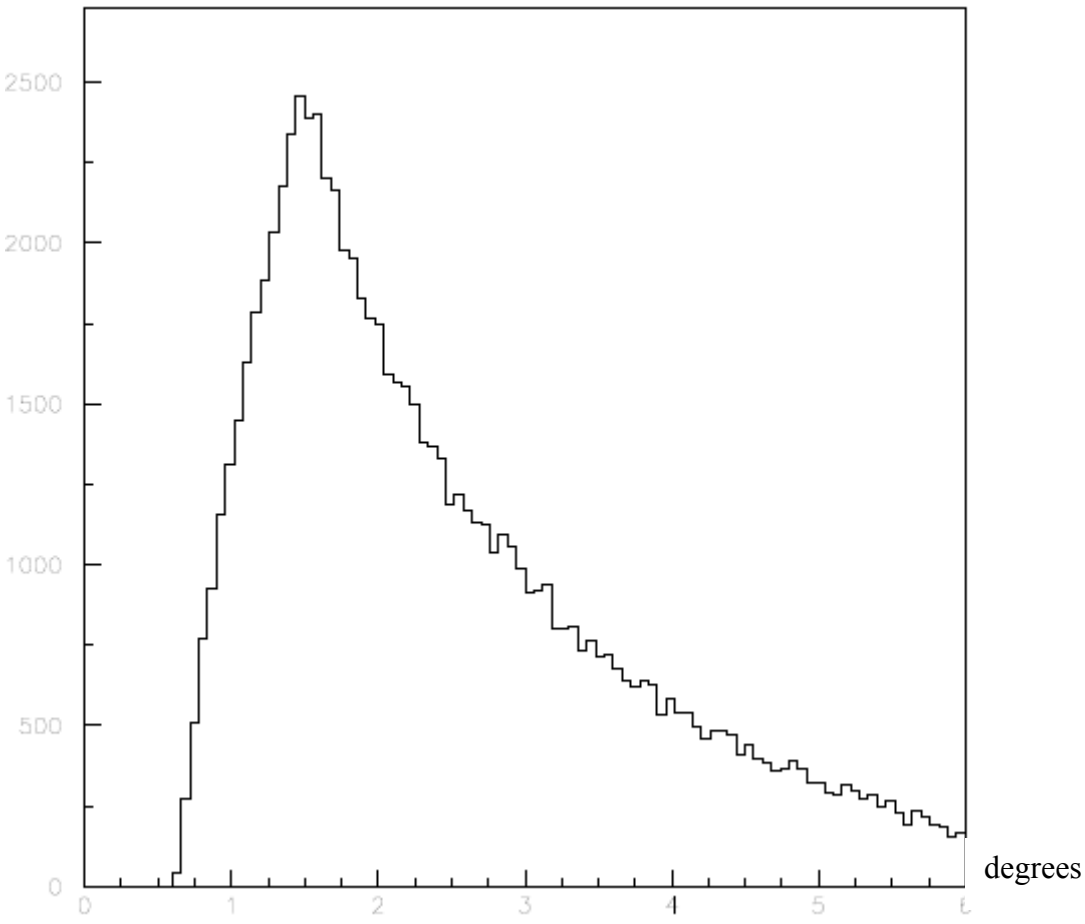

0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0
1
2
3
4
5
0.2
0.3
0.4
0.5
0.6

**E’** **ϵ**


2250
2000
1750
1500
1250
1000
750
500
250
0
0
1
2
3
4
5

**GeV**

**E’**




θ of virtual photon