Study of the azimuthal angle distributions of BH cross sections with k, Q2, xB and t.

The behavior of BH cross sections vs with Q^2 is explored at three different values of the beam energy while keeping the values of x_B at 0.343 and *t* at -0.172. The low, medium and high values of the beam energy used were respectively 3, 11 and 30 GeV. For each energy it was analized the region of Q^2 v alues that allows to obtain valid and non-negative values of the cross sections. These ranges are summarized in Table 1. For medium and high *k* the same Q^2 range was found.

Low k 3 GeV			**Medium k** 11 GeV		**High k** 30 GeV
Q^2 (GeV^2)					
[0.219 – 1.832]			[0.219 – 5.515]		
Low Q^2 0.4 GeV^2	**Medium Q^2** 1.2 GeV^2	**High Q^2** 1.82 GeV^2	**Low Q^2** 0.22 GeV^2	**Medium Q^2** 3 GeV^2	**High Q^2** 5.2 GeV^2
t					
[-0.099 – -0.690]	[-0.131 – -1.645]	[-0.139 – -1.475]	[-0.077 – -0.176]	[-0.146 – -1.030]	[-0.151 – -0.271]

Table 1: Limits of Q^2 and *t* values that allow to obtain valid and non-negative values of the cross sections.

Figure 1 displays the resulting distributions of the BH cross sections vs varying Q^2 in the ranges shown on Table 1 using steps of 0.2 GeV^2 for the low k and 0.45 GeV^2 for the medium and high k.

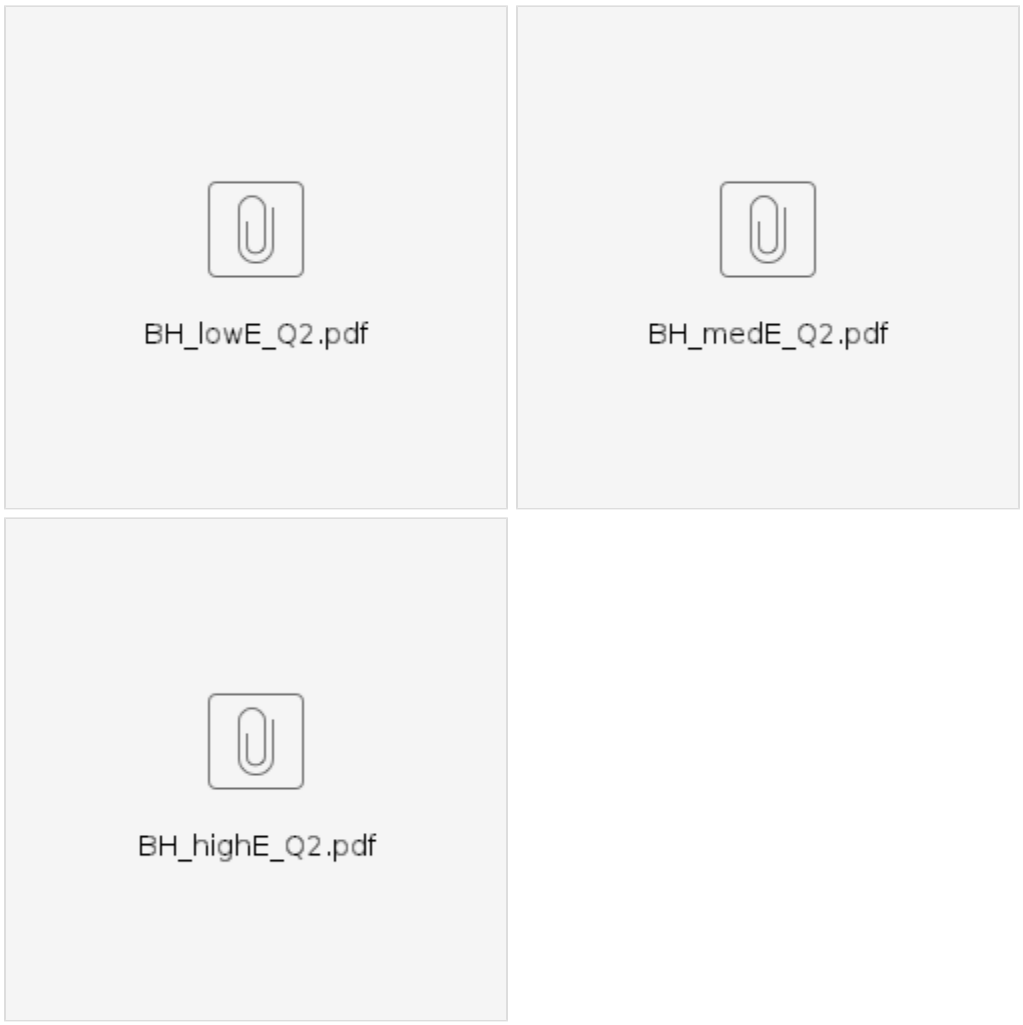

Figure 1: BH cross sections vs for different Q^2 values at low, medium and high k.

Furthermore, three values of Q^2 (i.e: low Q^2, medium Q^2 and high Q^2) were selected on the valid Q^2 ranges at low *k* and medium and high *k*. At low *k*, the selected values of Q^2 were 0.4, 1.2 and 1.82 GeV^2. For medium and high *k* it was selected Q^2 at 0.22, 3 and 5.2 GeV^2. Similarly, at the selected values of Q^2 for low medium and high *k*, it was studied the behavior of the BH cross sections vs for different values of *t*. Table 1 shows for the given values of *k* and Q^2 , the range of *t* where defined non-negative cross sections values are found. The results are shown on the Figures 2, 3 and 4 for low, medium and high *k* respectively.

Figure 2: BH cross sections vs for different t values at low *k* and low (left), medium (center) and high (right) Q^2 .

Figure 3: BH cross sections vs for different t values at medium *k* and low (left), medium (center) and high (right) Q^2 .

Figure 4: BH cross sections vs for different t values at high *k* and low (left), medium (center) and high (right) Q^2 .

- **Kinematic region where the cross section vs behaves closer to a linear distribution.**

The dependence of the azimuthal angle distributions of BH cross sections with x_B is shown on the following graphs. The values of k, Q^2 and t are fixed at 30 GeV, 3 GeV^2 and -0.151 respectively since as seen on the previous graphs, the cross section vs has a flatter behavior around those values. At those kinematics, x_B can take values between 0.054 and 0.348. The obtained distributions show that the cross sections become closer to a linear behavior as x_B increases.

Figure 5: BH cross sections vs for different x_B between 0.054 and 0.342 in logarithmic scale (left) and linear scale (right) around x_B higher values.

Figure 6: BH cross sections vs for different x_B between 0.318 and 0.348 with 0.005 step size.

Figure 6 shows that the behavior is nearly linear when x_B is equal to 0.348. Therefore x_B is fixed at that value while exploring the dependency of BH cross sections vs with t. Figures 7 and 8 show the resulting distribution when changing t.

Figure 7: BH cross sections vs for different t values between -0.151 and -1.015 in logarithmic scale (left) and linear scale (right) for the highest values of t.

Figure 8: BH cross sections vs for different t between -0.151 and -0.231 with -0.01 step size.