

Minutes of the meeting 13.05.2014: analysis of time-like form factor measurements at PANDA

[1] Presence:

Alaa Dbeyssi, Dmitry Khanef, Frank Maas, Maria Carmen Mora Espi, Egle Tomasi-Gustafsson and Manuel Zambrana.

[2] Discussions through the draft version of the paper sent by Egle on 11.05.2014 (version 0.0, pages: 1-9):

- The article will be sent to the European Physical Journal A.
- The title of the article is: Update of the feasibility studies of the time-like proton electromagnetic form factor measurements with PANDA at FAIR.
- Modifications:
 - * The form of Eqs. 3-9 needs to be changed to fit into one line or omitted.
 - * The figure 1 for the effective proton form factors needs to be replaced by a figure of the total cross section with different parametrization of the proton FF (σ -data), together with the data. This figure helps us to choose the parametrization which gives the better estimation of the signal counting rate.
 - * Dmitry prepares a figure for the angular distribution of the signal with a MC event generator at the three points of energy $s = 5.4, 8.2$ and 13.8 GeV^2 (form factor ratio $R = 0, 1, 3$).
 - * Add the plots for the integrated cross section of pions using the generator developed by the Mainz group with different angular cuts, and the ratio of the total cross sections pions/electrons as a function of momentum transfer squared.
 - * The name of the variables used in Table 1. (p9) should be compatible with the name of the variables defined in the text of the paper (integrated *int*).

[3] If new simulation is required, the background ($\bar{p}p \rightarrow \pi^+\pi^-$) events will be generated in the angular range $|\cos\theta| \leq 0.8$ for $s = 5.4, 8.2$ and 13.8 GeV^2 .

- [4] Egle prepares a small note on why the definition of the effective form factor is equivalent to extrapolating a value of FF from the cross section with $|G_E| = |GM|$,
- [5] Discussions on the statistical fluctuations of the statistical error on the proton form factors: The statistical error on the FF is obtained by a fit to the events of the signal generated according to the corresponding counting rate. To avoid the effect of the statistical fluctuation, this procedure have to be done several times and one will obtain a Gaussian distribution. The final value of the statistical error is taken as the mean value of this Gaussian distribution. Discussion on this point will be postponed after a short note will be prepared by Egle on statistics.
- [6] Alaa, Dmitry and Maria Carmen prepares a table of comparison (digitization, tracking, PID algorithms, ...) between the BaBar and the PANDARoot software.