

Electromagnetic and hard exclusive processes at PANDA

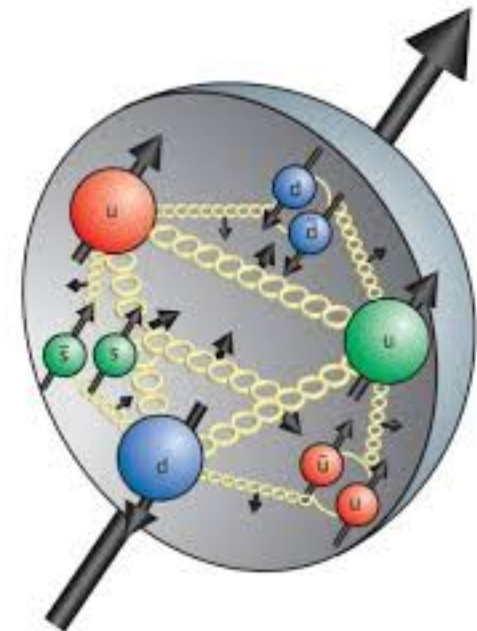
Current activities

Alaa Dbeyssi (for the EMP working group)

PANDA CM, 06.11.2018

Helmholtz-Institut Mainz

Johannes Gutenberg University



PhD Thesis Defense (Iris Zimmermann, 22.10.2018 HIM)

Feasibility studies for the measurements of time-like proton form factors at PANDA

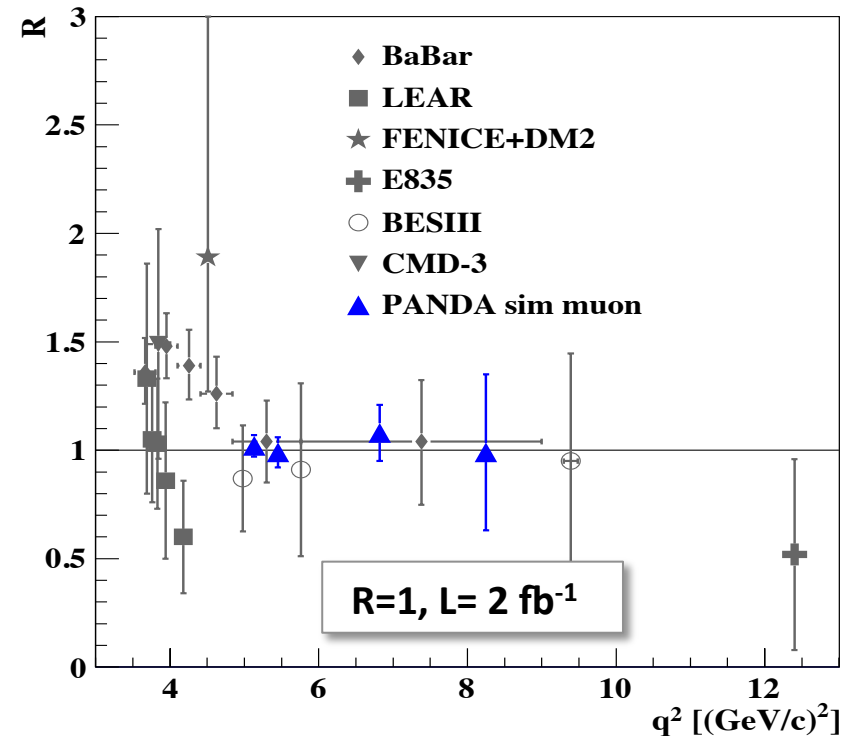
$$\bar{p}p \rightarrow \mu^+ \mu^-$$

Results for PANDA Phase-3

- Approved by the Review Committee
- Journal paper (on behalf of the PANDA Collaboration) in progress

Results for PANDA Phase-1

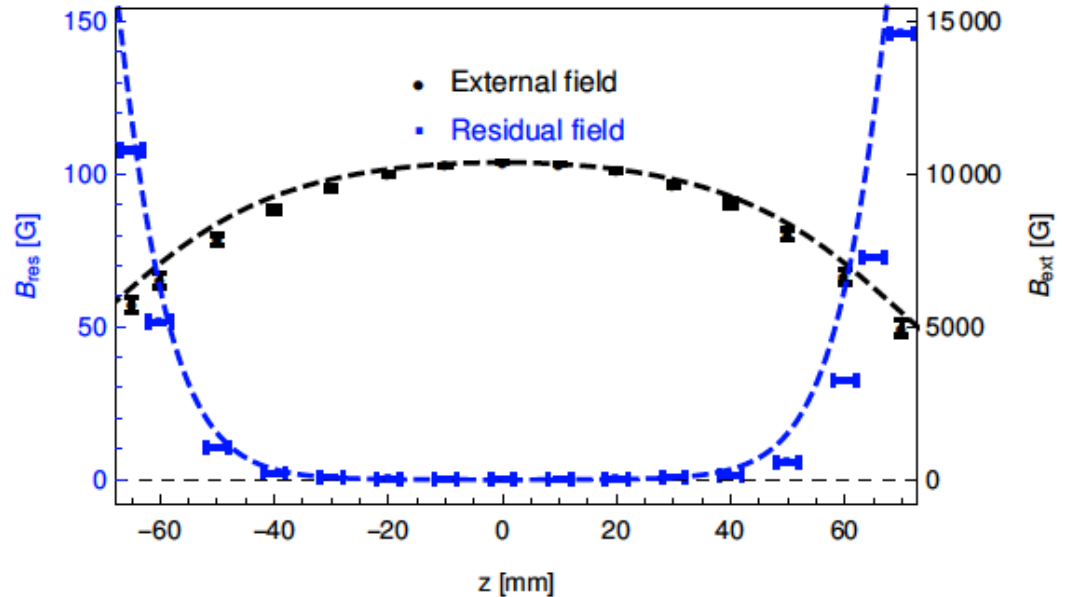
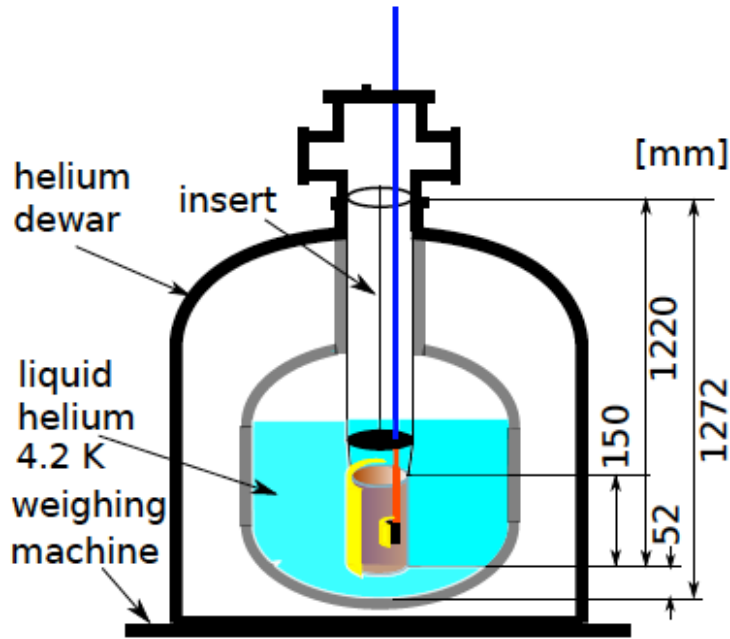
- Approved by the Review Committee
- PANDA Phase-1 paper



PhD Thesis Defense (Bertold Fröhlich, 23.10.2018 HIM)

Investigation on intense magnetic flux shielding with a high temperature superconducting tube for a transverse polarized target at the PANDA experiment

- A transversally polarized target at PANDA requires longitudinal shielding.

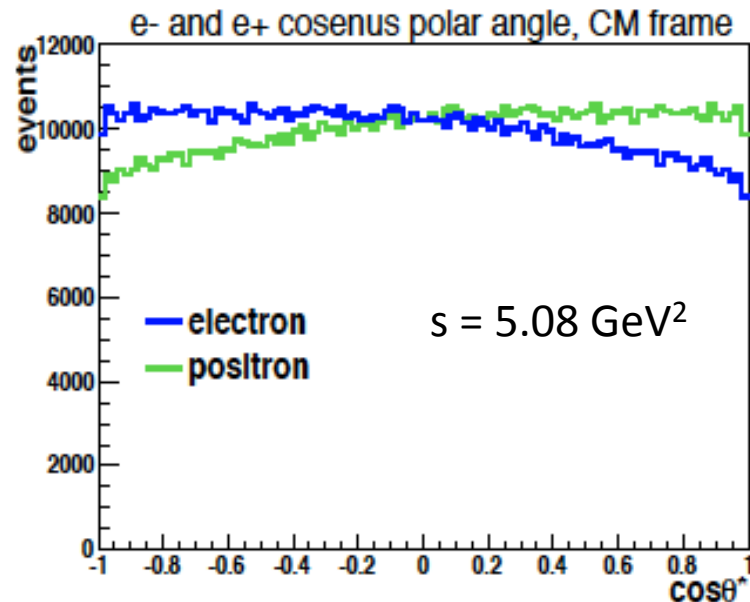
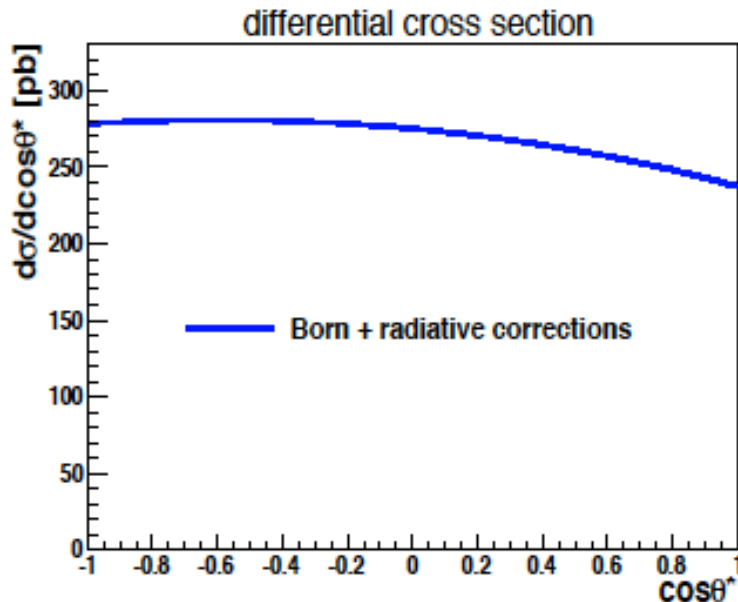


- The experimental investigations have shown that with a shielding tube (BSCCO) with a wall thickness of 3.5 mm, a magnetic flux density of 1T can be shielded

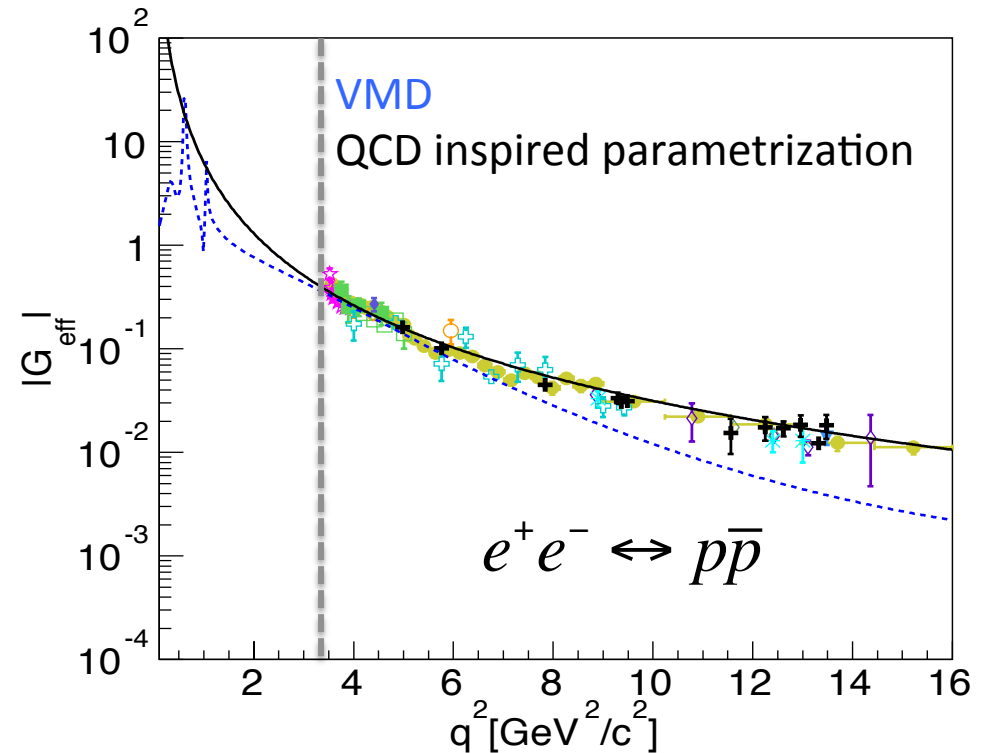
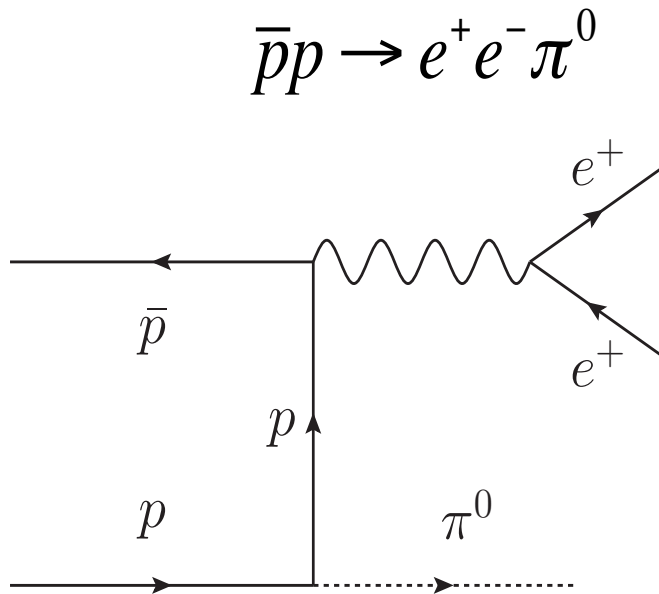
Radiative corrections on $p\bar{p} \rightarrow e^+e^-$ at PANDA

Monte Carlo event generator (M. Zambrana *et al.*)

- First order radiative corrections to $p\bar{p} \rightarrow e^+e^-$ have been calculated in the point-like approximation, including both virtual and real corrections, and interference effects.
- Event generators have been developed on the basis of the calculated cross section.
- The numerical accuracy of the obtained results is currently under investigation.

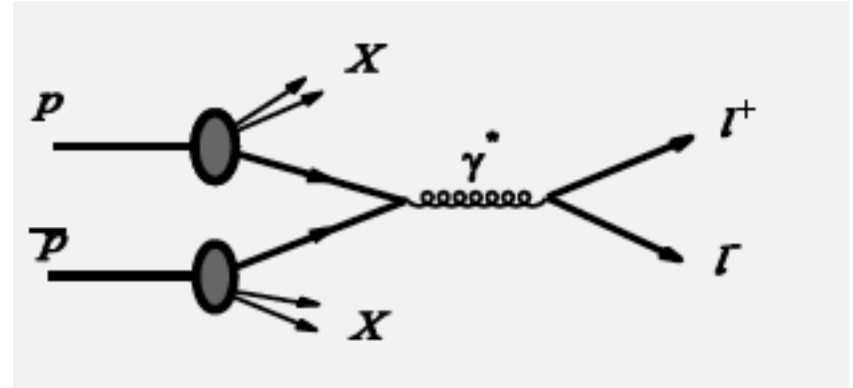
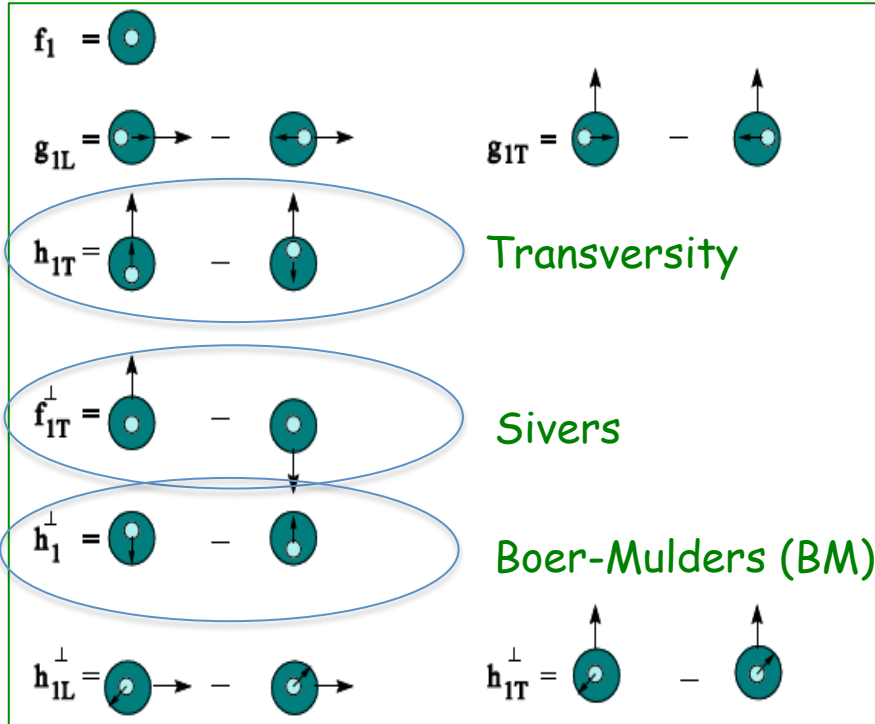


Electromagnetic form factors of the proton in the unphysical region



- Feasibility studies with PANDARoot are ongoing
- Development of an event generator for this process based on the existing calculations of the differential cross section is needed

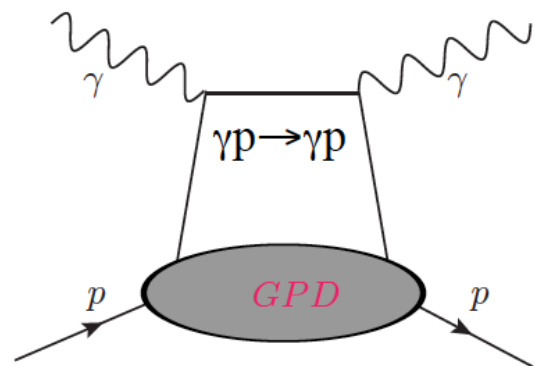
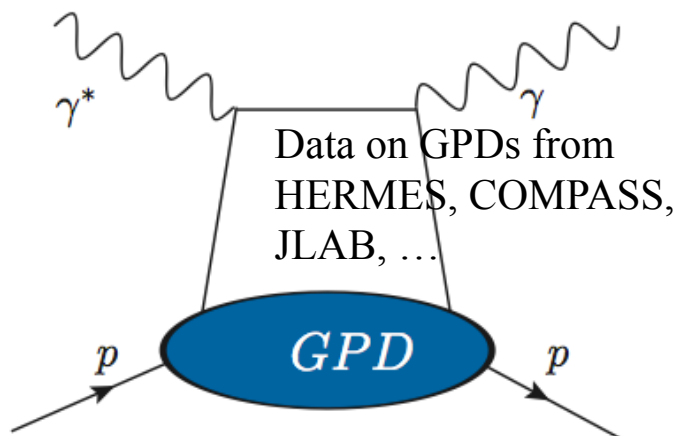
Drell-Yan at PANDA (Anna Skachkova)



- PANDA: Boer-Mulders with unpolarized proton-antiproton experiment; Sivers and Transversity with a polarized target

The main task - to determine if STT would be able to resolve a small kink of pion-to-muon trajectory as the most strong criterion of Signal and Background separation

Hard exclusive processes at PANDA

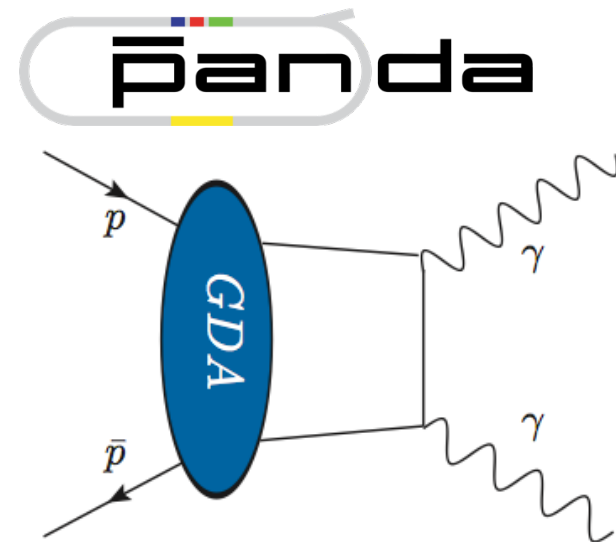


Wide Angle Compton Scattering

$t \leftrightarrow s$ channels
GPDs \leftrightarrow GDAs



GDAs



- Fermilab $ppbar \rightarrow \gamma\pi^0$ data [8.5 – 13.6] GeV²
 - Belle, CLEO, ... $\gamma\gamma \rightarrow ppbar$ data below 16 GeV²
 - Precise data at higher energies and with different processes are needed
- PANDA: $ppbar \rightarrow \gamma\gamma, \gamma M$ ($M = \pi^0, \eta, \rho^0, \phi$)

Time-Like Wide Angle Compton Scattering

Feasibility studies with
PANDARoot are needed