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Proton Time-Like Form Factors at PANDA

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for the PANDA collaboration.

The proton electric and magnetic form factors in the time-like region (TL-FF) could offer a much richer set of information if compared to the one that can be accessed via the space-like form factors (SL-FF), for which several controversial data are present. An independent experimental determination of the TL-FF would allow for:
- a global description of the hadronic TL- and SL-FF via analytic continuation techniques, and hence the development of realistic models able to describe the nucleon structure in the whole kinematical region;
- a selection among the (vastly) different theoretical predictions available in the literature.
Due to the high precision needed and the involved energies and transfer momenta, radiative corrections due to real and virtual photon emission from the charged particles (in particular electrons) must be taken carefully into account.

The experimental scenario constituted by the PANDA spectrometer on the HESR ring (part of the forthcoming FAIR facility) would allow to access and to perform an independent evaluation of the TL electric and magnetic proton FF, with unprecedented luminosities in annihilation processes and transferred momenta large enough (q^2 up to 25 GeV^2) to probe the asymptotic FF behaviour.

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