Welcome
Mainz Perspective

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TPC Collaboration Meeting
March 09-10, 2020
Goals of this Meeting

Decision to hold as a video conference: „Better safe than sorry ...“

- Review of the physics case for a proton radius experiment
- Review of the technical aspects of the detector construction → share of responsibilities
- Discuss important additional technical aspects as safety system
- Formal aspects towards realization of a collaboration

Foundation of a collaboration !!!
for which the name needs to be decided at this meeting ...
Proton Radius Puzzle .... ?

In case that the value from muonic hydrogen is correct:

- Why are old electron scattering experiments wrong?
- What about the magnetic radius for the proton?
- Why are old (and some of the new) electronic spectroscopy measurements wrong?
- Why there are puzzles for some of the light nuclei, for others not?
- We need to improve the precision even further → electron scattering can help?
Mainz Efforts

- **Initial State Radiation** programme at A1/MAMI
  → access to low Q²

- Repeat Bernauer measurement with **gas jet target** at A1
  → significant reduction of systematic errors

- Form factor programme at A1 of **few body systems (d, ^4He)**
  → comparison of radii with muonic spectroscopy
  → essential input to reduce two-photon corrections for muonic spectroscopy

- **TPC measurement** at MAMI

- **Form factor programme** at MAGIX at new MESA accelerator
  → access to low Q² due to low beam energy
  → significant reduction of systematic errors (gas jet target)
  → magnetic FF and few body programme
Electron Beam Line in A2 Hall

Separate Photon and Electron Beam Line highly desirable
Towards a TPC Experiment at MAMI ...

- Safety concept ready
  → significant risk: external consulting company for proof of safety concept
  → the earlier we receive necessary information, the earlier it will be ready

- Ongoing upgrade of fire protection system at MAMI by local authorities
  → Hydrogen experiments is part of the programme (we do depend on others ...)

- Construction of MESA experimental hall ongoing (in close vicinity to A2 hall)
  → constraints on beam time

- Ongoing experimental programme at Crystal Ball/TAPS
  → existing and upcoming proposals

- Constraints or synergies with CERN measurement of proton radius

**Optimal scenario: start of data taking beginning of 2022**