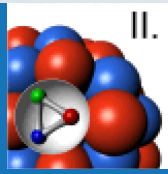
JLU
NEUE WEGE. SEIT 1607.

JUSTUS-LIEBIG-
UNIVERSITÄT
GIESSEN

K.-Th. Brinkmann, II. Physik, JLU Giessen



II. Physikalisches
Institut

GIESSEN APPLICATION TO CLAS12

HIC for FAIR
Helmholtz International Center

Bundesministerium
für Bildung
und Forschung

panda

MVD
panda

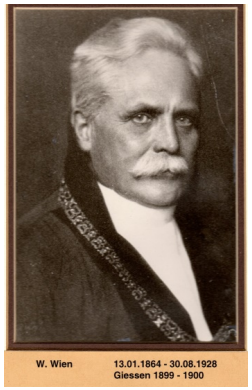
Justus-Liebig-Universität Gießen

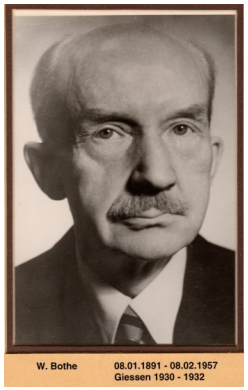
Medium-sized German university

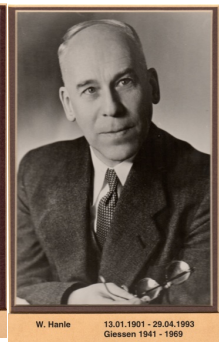
- 28,000 students
- 4,500 faculty and staff (333 professors)

- Physics:
- 15 faculty members in

- subatomic physics,
- solid state physics,
- laser physics,
- applied physics,
- didactics







The group

Kai-Thomas Brinkmann

- full professor (Gießen since 2012)
- previously faculty pos. in Bonn, Dresden
- currently dean of the faculty of mathematics and informatics, physics and geography
- worked on:
  nuclear physics
  nucleon-nucleon collisions at COSY (3 GeV proton synchrotron)
  γN at ELSA (3 GeV synchrotron, tagged photons), crystal barrel detector
  instrumentation and applications in medical physics, space applications

- Current focus on $\bar{\text{P}}$ANDA

Group

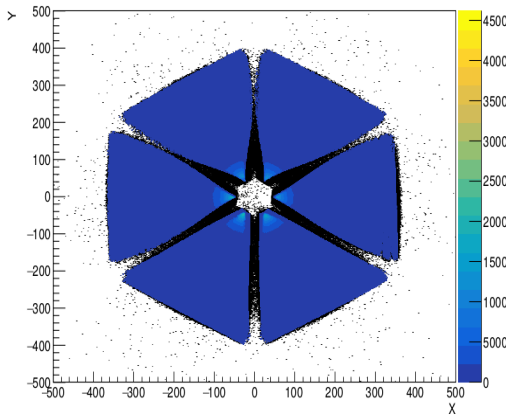
Staff

1 permanent, 2 tenure track, 2 project funding

- Dr. Hans-Georg Zaunick — hardware PANDA EMC, MVD
- Dr. Markus Moritz — hardware PANDA EMC, simulations
- Dr. Mariana Nanova — CBELSA/TAPS analysis ($\pi\eta N$)
- Dr. Valery Dormenev — scintillator research, PANDA EMC
- Dr. Stefan Diehl — CLAS12 analysis and service work, some PANDA

Currently 5 PhD students

- Aron Kripko — PANDA simulation tasks, now started work for/with Stefan



More positions available

Postdocs, PhD students and master and bachelor students

Service

Ongoing

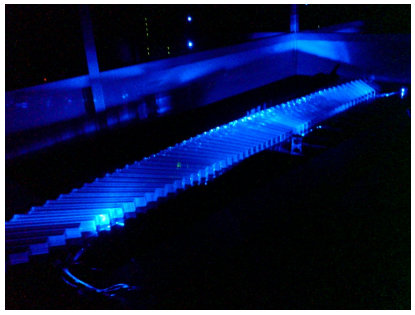
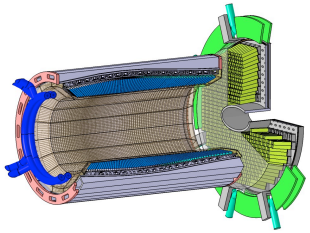
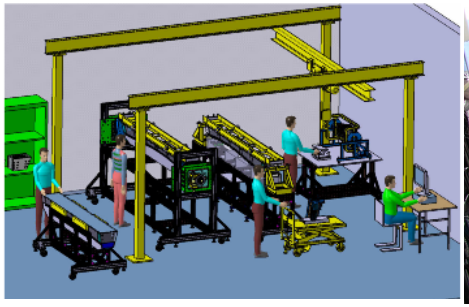
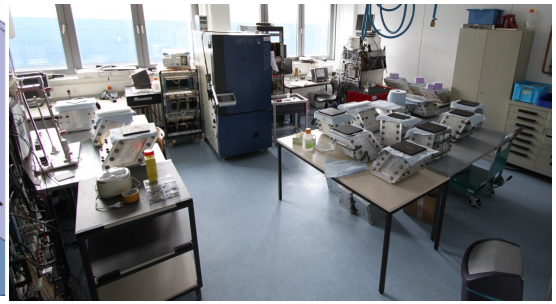
Stefan Diehl's contributions

Aron Kripko was set to spend April at Jlab contributing and getting acquainted; deferred.

Lab capabilities and experience in instrumentation

Profound experience in hardware

- Lead lab PANDA EMC barrel construction
- Lead lab PANDA PWO crystal development, test; PANDA APD rad hardness testing
- Scintillator development, crystalline and amorphous, fast timing

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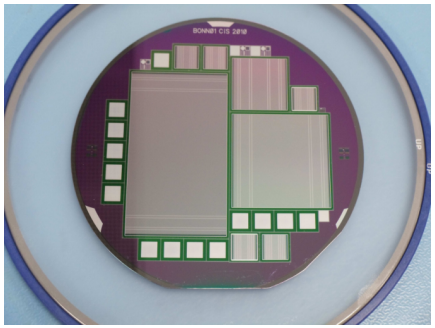
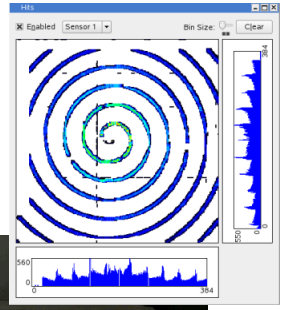
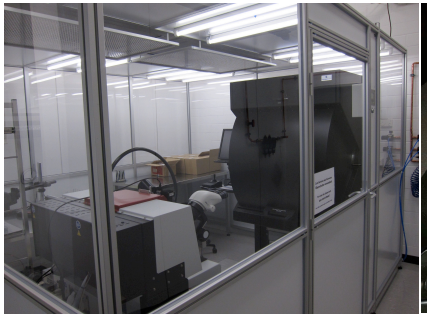
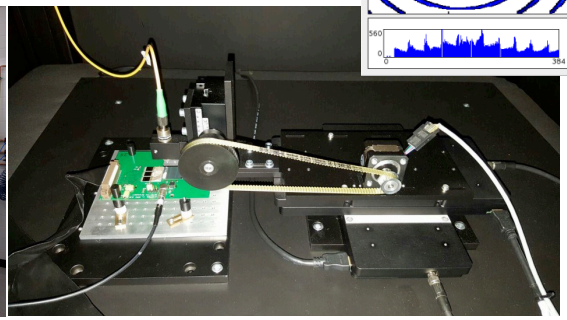
- PANDA Microvertex detector development









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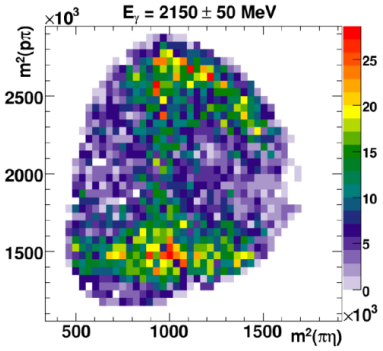
Experience in analysis, simulations

- CBElsa analysis, PANDA simulation and analysis
- detector models and coding

Physics

History

Double-meson production at ELSA

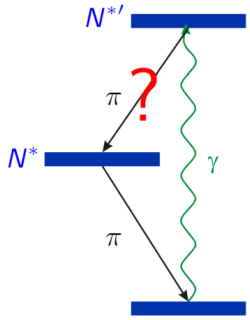


$\gamma p \to p\pi^0\eta$

E.G., V. Credé, V. Sokhoyan, H. van Pee *et al.*,
Eur. Phys. J. A **50** (2014) 74

Clear evidence for isobars in the reaction:

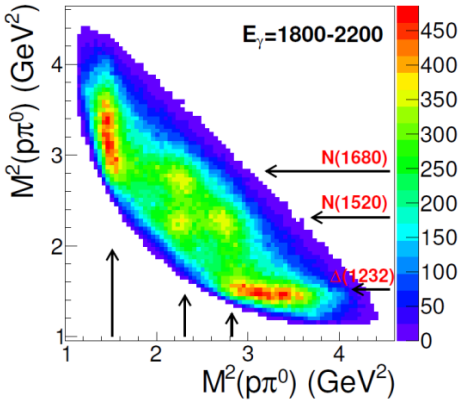
- $\Delta(1232)\frac{3}{2}^+\eta$
- $N(1535)\frac{1}{2}^-\pi^0$
- $a_0(980)p$



$\gamma p \to p\pi^0\pi^0$

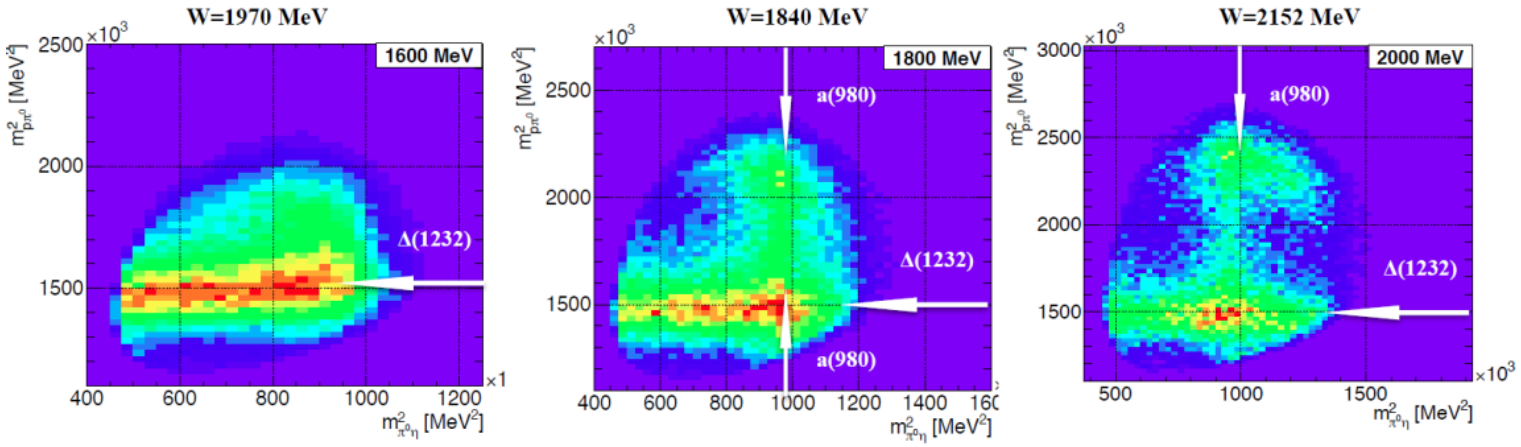
V. Sokhoyan, E.G., V. Credé, H. van Pee *et al.*,
Eur. Phys. J. A **51** (2015) 51

- $\Delta(1232)\frac{3}{2}^+\pi^0$
- $N(1520)\frac{3}{2}^-\pi^0$
- $N(1680)\frac{5}{2}^2\pi^0$
- also seen: $N(1440)\frac{1}{2}^+\pi^0$, $f_0(980)p$, ...

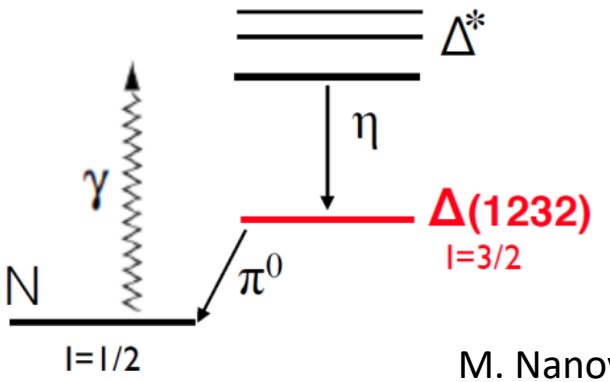


Physics

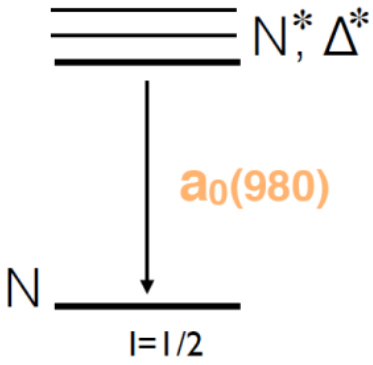
History Double-meson production : ongoing work at ELSA



$\Delta^* \rightarrow \Delta(1232)\eta \rightarrow N\pi^0\eta$;



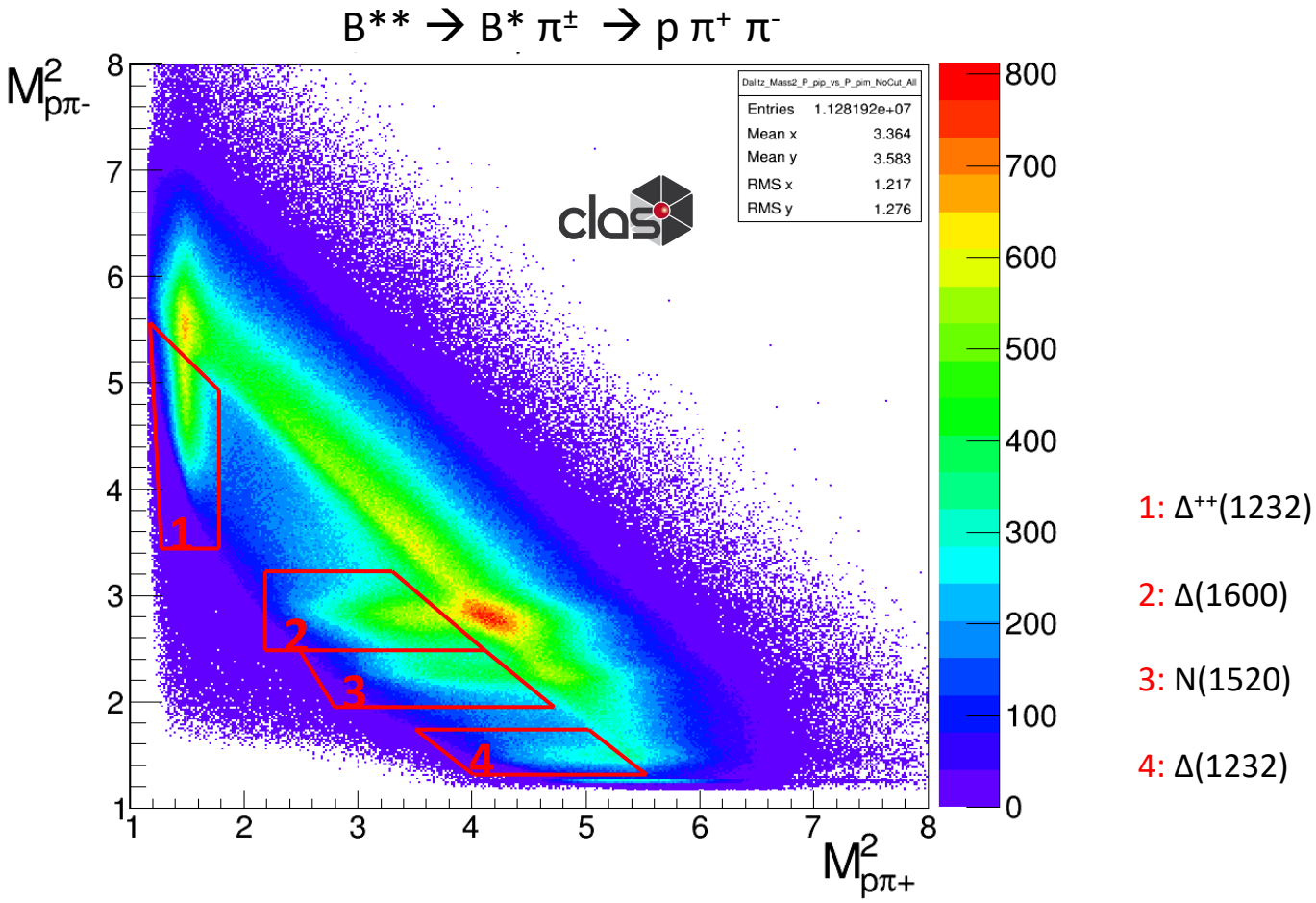
$N^*, \Delta^* \rightarrow N\, a_0(980) \rightarrow N\pi^0\eta$



M. Nanova, CBElsa 2017

Physics

History Double-meson production: some CLAS6 analysis

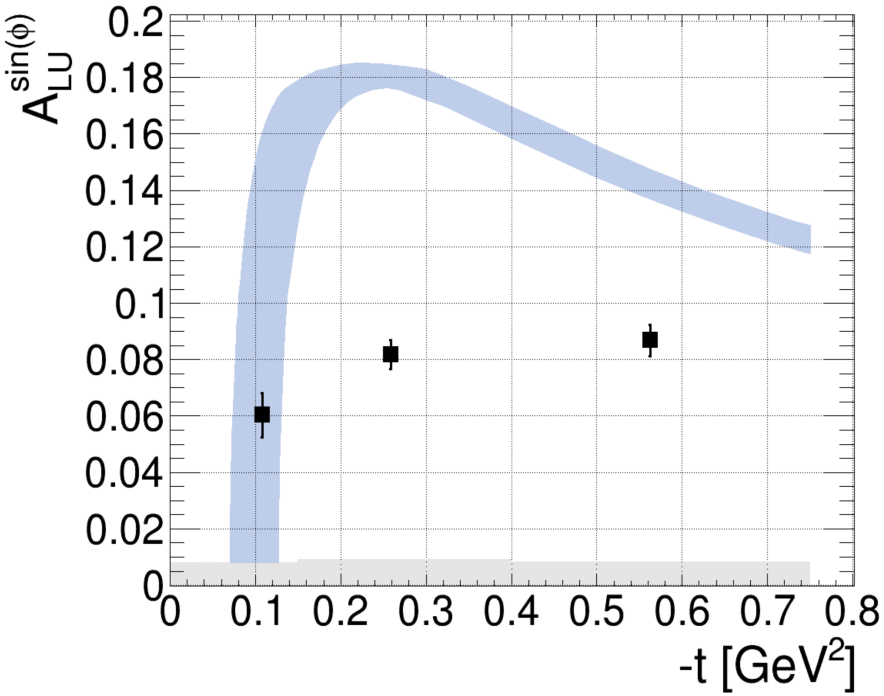


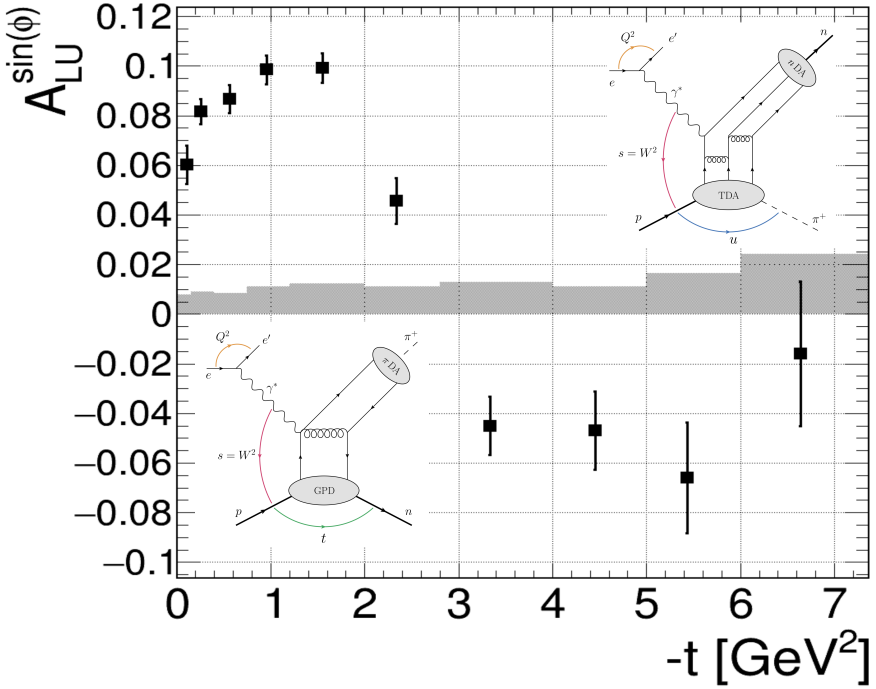
Physics

Recently completed work on CLAS paper

Extraction of beam-spin asymmetries from the hard exclusive π^+ channel off protons in a wide range of kinematics

S. Diehl,[7,23] K. Joo,[7] A. Kim,[7] H. Avakian,[38] P. Kroll,[47] K. Park,[24] D. Riser,[7] K. Semenov-Tian-Shansky,[28]





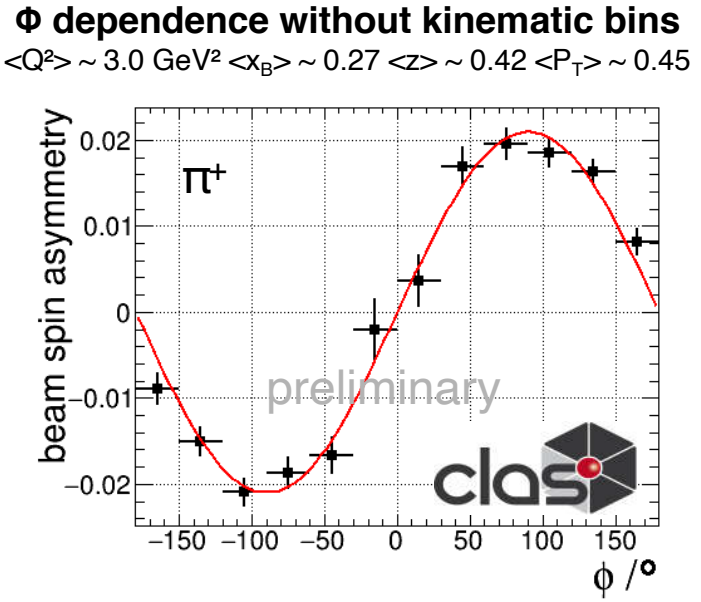
Physics

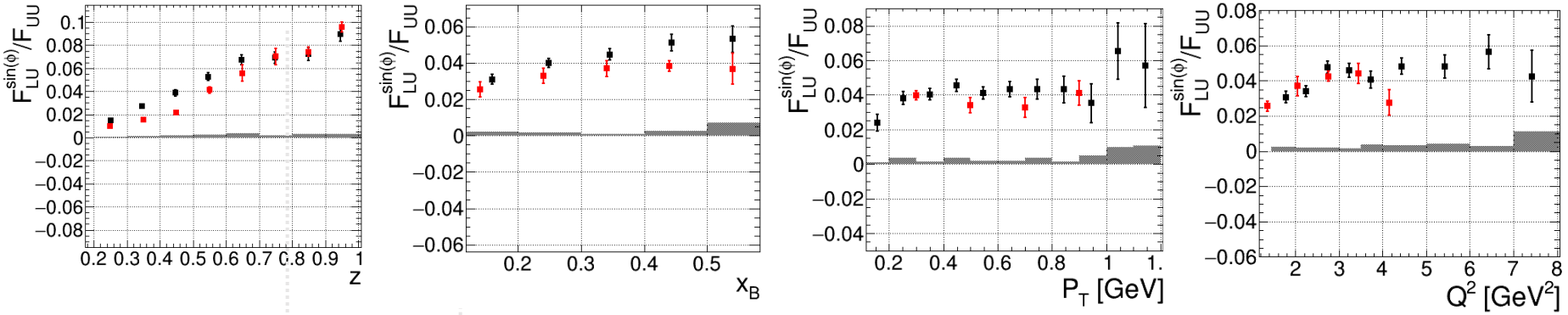
Plans

Continue Stefan‘s work on SIDIS with single pions

⇒ Beam spin asymmetries BSA with CLAS 12

⇒ (cf. Stefan’s talk tomorrow)





π^+

■ CLAS12 ■ CLAS [W. Gohn et al. PRD 98 (2014)]

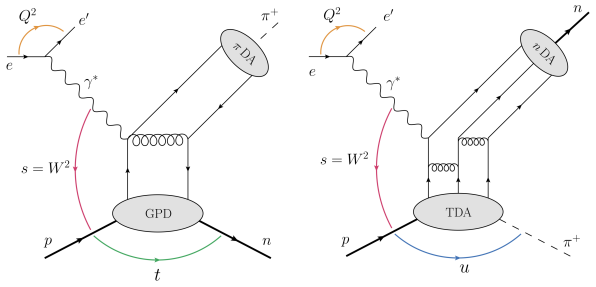
Physics

Plans

Comparison of forward and backward physics: GPDs vs TDAs

Hard exclusive meson production at small u channel transfers with CLAS12

S. Diehl



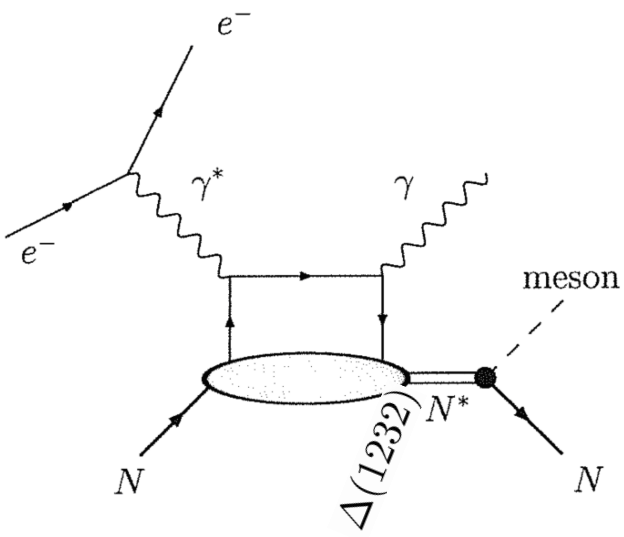
Measurement of transition GPDs in non-diagonal DVCS with CLAS12

$$\gamma * p \to N * \gamma \to p\pi^0\gamma \to p\gamma\gamma\gamma$$

$$\gamma * p \to N * \gamma \to n\pi^+\gamma$$

$$\gamma * p \to N * \gamma \to p\rho/\omega\gamma \to p\pi^+\pi^-\gamma$$

S. Diehl



Plans

- Aron‘s PhD work on SIDIS with kaons to be applied for as a project once group is accepted (Aron did service work on calibrations etc. for Stefan to get acquainted with the software)
- Contribute to experiments
- Get more students interested
  (hadron spectroscopy and intersection to nucleon structure)
- Contribute to experiments, calibration and software development
- **Find funding**
- Common hardware interest? Future developments?

Thank you.