Workshop on □□ physics at electron-hadron colliders

Report of Contributions

https://indico.cern.ch/e/gamma-eh-workshop

Contribution ID: **1** Type: **not specified**

Workshop introduction

Friday 28 February 2025 09:20 (10 minutes)

Presenters: KHANPOUR, Hamzeh (AGH University of Science and Technology); PIOTRZKOWSKI, Krzysztof (AGH University (Kraków, PL)); FORTHOMME, Laurent (AGH University of Krakow (PL))

Contribution ID: **2** Type: **not specified**

Two-photon physics with the CepGen event generator and ⊠⊠ → W+W-/ZZ at LHC and LHeC

Friday 28 February 2025 11:40 (20 minutes)

CepGen is a matrix element level Monte Carlo generator intended for the simulation of central exclusive processes (and in particular $\gamma\gamma$) at LHC. In the recent years, numerous extensions allowed it to simulate an even broader range, e.g. diffraction and UPC interactions.
In this talk, the generator will be presented along its modular extensions capability, allowing e.g. the definition of new processes, and incoming partons fluxes modellings, or interfacing to existing libraries.

Author: FORTHOMME, Laurent (AGH University of Krakow (PL))

Presenter: FORTHOMME, Laurent (AGH University of Krakow (PL))

Contribution ID: **3** Type: **not specified**

Exploring High Energy Photon-Photon Interactions at the LHeC

Friday 28 February 2025 09:30 (20 minutes)

The future Large Hadron-Electron Collider (LHeC) provides a unique platform to explore high-energy photon-photon ($\gamma\gamma$) interactions in electron-proton collisions. This talk focuses on the exclusive production of lepton pairs and the potential to probe supersymmetric particles, such as higgsinos, through photon-induced processes. Utilizing the Equivalent Photon Approximation (EPA), we investigate the kinematic properties and cross-sections of such interactions. Additionally, we compare our calculations based on EPA with predictions from various event generators, including cepgen/Lpair, and GRAPE, demonstrating excellent agreement. The high luminosity and clean environment of the LHeC make it an ideal laboratory for testing photon-induced processes, providing valuable insights into electroweak interactions and possible extensions of the SM.

Author: KHANPOUR, Hamzeh (AGH University of Science and Technology)

Presenter: KHANPOUR, Hamzeh (AGH University of Science and Technology)

Contribution ID: **4** Type: **not specified**

Virtual Compton scattering processes in upcoming experiments

Friday 28 February 2025 11:00 (20 minutes)

In my talk, I will describe recent progress in the study of a family of virtual Compton scattering (VCS) processes within the framework of generalized parton distributions (GPDs). This includes deeply virtual Compton scattering (DVCS), timelike Compton scattering (TCS), and double deeply virtual Compton scattering (DDVCS). I will also focus on the measurability of these processes in upcoming JLab and EIC experiments. In particular, I will present preliminary impact studies for DVCS at EIC.

Author: SZNAJDER, Paweł (National Centre for Nuclear Research)

Presenter: SZNAJDER, Paweł (National Centre for Nuclear Research)

Contribution ID: **5** Type: **not specified**

Photon transition form factors of C-even quarkonia for virtual photons

Friday 28 February 2025 10:10 (20 minutes)

Presenter: SCHAEFER, Wolfgang

Contribution ID: **6** Type: **not specified**

TBA

Presenter: LUSZCZAK, Marta

Contribution ID: **7** Type: **not specified**

Production of exclusive dijets at electron-proton colliders

Friday 28 February 2025 09:50 (20 minutes)

Presenter: SZCZUREK, Antoni

Contribution ID: **8** Type: **not specified**

□□ ⟶ μ+μ-, □+□- at EIC

Friday 28 February 2025 11:20 (20 minutes)

The two-photon exclusive production of lepton pairs at the Electron–Ion Collider will open interesting research directions thanks to a very high luminosity and clean experimental conditions. A survey of the scientific potential of such studies is reported. In particular, we consider unique measurements of the proton elastic electromagnetic form-factors and a possibility of studying the anomalous electromagnetic dipole moments of tau leptons.

Presenter: PIOTRZKOWSKI, Krzysztof (AGH University (Kraków, PL))

Contribution ID: **9** Type: **not specified**

Topical discussion

Friday 28 February 2025 13:00 (2 hours)

- Precise simulation of Bethe-Heitler two-photon production of lepton pairs at polarised EIC
- Tau-tau production & decay at EIC
- Nuclear effects in gamma-gamma to lepton pairs at eA@EIC
- Tau-tau final state analysis at LHeC
- Two-photon production of W, or Z pairs at LHeC (incl. 2-to-6 simulation)
- Photoproduction of t-tbar at LHeC
- Event generators developments