ECT Trento Workshop : nucleon and nuclear structure through dileptons production

Monday, October 24, 2016 - Friday, October 28, 2016

Scientific Program

Similarly to electroproduction with respect to the photoproduction, looking at a virtual photon in the final state gives an additional degree of freedom to study the nucleon structure. The virtual photon can be detected by detecting its decay in a lepton pair. Such processes were already studied in the Hall B CLAS 6 GeV data but due to the limited beam energy it was difficult to have enough virtuality on both incoming and outgoing photon to ensure a description of the process only in term of quarks. With the 12 GeV beam availability the situation is much improved opening the door to an extensive study of this processes. Another main drawback of such processes is the suppression of the cross-section roughly by a factor 100 (alpha electromagnetic constant) compared to real photon cross-sections. New detector technologies can allow a factor 10 to 100 luminosity increase compared to what was done before making the study of these processes feasible in a reasonable timeframe. Thus the goal of this workshop is to determine what the impact of the production of dilepton can have on our knowledge of the nucleon structure in particularly in terms of Generalized Parton Distributions. Each day of the workshop will have a topic with discussion time at the end of day. After an introduction about the current status of Generalized Parton Distribution program and the different models currently available to describe them, the Double Doubly Virtual Scattering, Timelike Compton Scattering and meson productions processes will be presented both on the theoretical side to emphasize their contribution in the GPDs determination and on the experimental side to show which measurements could be carried. Finally the current GPDs fitting techniques will be presented to see how much the production of dileptons can help in the GPDs extraction and what work is needed to be able to include the dileptons processes in those fitting techniques. We hope that this workshop will be a starting point, giving first directions on what measurements and what accuracies will be needed for the measurement of dileptons processes in order to optimize the process of GPDs extraction.

Main Topics:

Dileptons production processes GPDs modeling,extraction and fitting

D-term and dispersion relations

Time-like Compton Scattering on Nucleon

Double Deeply Virtual Compton Scattering

Vector Meson Production

Drell Yann process

Keynote Participants:

Nathan Baltzell (Jefferson Laboratory, USA) Marie Boer (Los Alamos National Laboratory, USA) (TBC) Michel Guidal (IPN Orsay, France) Vadim Guzey (Petersburg Nuclear Physics Institute (PNPI), Russia) Jordanka Ileva (University of South Carolina, USA) Kondo Kgnanvo (University of Virginia, USA) Peter Kroll (University of Wuppertal, Germany) Kresimir Kumericki (University of Zagreb, Croatia) Zein-Eddine Meziani (Temple University, USA) Pawel Nadel-Turonski (Jefferson Lab, USA) (TBC) Franck Sabatie' (CEA/IRFU Saclay, France) Kirill Semenov (Petersburg Nuclear Physics Institute (PNPI), Russia) Stepan Stepanyan (Jefferson Lab, USA) Vardan Tadevosyan (University of Yerevan , Armenia) Oleg Teryaev (JINR, Dubna Russia) Anthony Thomas (University

of Adelaide, Australia) Marc Vanderhagen (University of Mainz, Germany) (TBC) Jakub Wagner (National Center for Nuclear Research, Poland) Samuel Wallon (LPT Orsay, France) (TBC) Christian Weiss (Jefferson Lab, USA) Organizers: Alexandre Camsonne (Jefferson Lab) Eric Voutier (IPN Orsay, France) Lech Symanowski (National Centre for Nuclear Research, Warsaw)