Drell-Yan Scattering and the Structure of Hadrons

ECT* Trento (Italy), 21-25 May 2012

Since it was first observed, Drell-Yan scattering has been an important tool, used to determine the substructure of both the beam and target hadrons. We are now working toward extending our knowledge of hadron structure from a single dimension (parton and parent hadron momenta collinear) to include transverse degrees of freedom as well. Deep inelastic scattering (DIS) experiments are largely contributing toward this goal, but a complete picture requires Drell-Yan scattering data as well.

This workshop will focus on the future theoretical and experimental work that is necessary to exploit fully the upcoming Drell-Yan measurements that will take place at Fermilab, CERN, Brookhaven, GSI-FAIR, and JINR (NICA). Because the Drell-Yan experiments will be collecting significant data samples in the next few years, we believe that this is the time for this workshop. The ability to measure the transverse structure of hadrons in both DIS and Drell-Yan scattering is enabling a test of the universality of transverse momentum dependent parton distributions (TMD) and, more generally, of the present understanding of (TMD) factorization theorems and color charge flow in QCD. In particular, the Sivers' function, $f_{1T}^{\perp}$, which arises from final-state interactions in DIS, but initial-state interactions in Drell-Yan scattering, is believed to change sign between the two processes. Experimentalists have only recently been able to extract it from DIS scattering. Soon, a new generation of Drell-Yan experiments will also focus on it. Questions to be addressed at this workshop include:

- What is the theoretical basis for expecting a change in sign of the Sivers' function when probed with Drell-Yan scattering? What are the implications of an experimental evidence for no sign change?
- Is there only a sign change, with a universal magnitude for the Sivers' function?
- How much do we know the shape of the Sivers' function? In order to reconcile the outcome of calculations in TMD- and collinear-factorization, does the Sivers' function need to have a node?
- What do violations of the Lam-Tung relation for Drell-Yan imply, in general and in terms of TMD?
- What can be measured about the structure of the pion and kaon with Drell-Yan?
- How is the EMC effect manifest in Drell-Yan scattering?
- What is the underlying mechanism of the generation of the hadron's sea quark distributions?

While the first of these questions are focused on polarized Drell-Yan experiments, it is important to remember that there still remain issues of hadron structure that can only be directly addressed with unpolarized (or polarization averaged) Drell-Yan measurements.

INVITED KEY SPEAKERS

W. Vogelsang (Univ. Tuebingen), J.-C. Peng (Univ. Illinois), V. Barone (Univ. Piemonte Orientale), A. Prokudin (JLab), S. Melis (ECT*), Z. Lu (S.E. Univ. Nanjing), A. Bacchetta (Univ. Pavia), B. Pasquini (Univ. Pavia), L. Gamberg (Penn State at Berks), Y. Koike (Univ. Niigata), H. Crawfort (Univ. California), M. Chiosso (Univ. Torino), C. Dutta (Univ. Michigan), M. Destefanis (Univ. Torino), O. Shevchenko (JINR Dubna), E. Nocera (Univ. Milano), M. Schlegel (Univ. Tuebingen), L. Szymanowski (Inst. Nucl. Studies, Warsaw), M. Radici (INFN Pavia).

WEB PAGE AND REGISTRATION

The web site of the workshop is

http://www.phy.anl.gov/ectdrell-yan/

The registration web page can be found on the ECT* web site at

http://www.ectstar.eu/Scripts/Wks/questionnairemod.pl?wksid=97

The deadline is May, 7th 2012.

There is no registration fee. Please, indicate in the registration form if you need any local support from ECT*, keeping in mind that according to ECT* rules at least 25% of participants must be self-supporting, and finances are limited.

TRAVEL

All informations about travelling to ECT* and moving around Trento, can be found at the ECT* web site at the link

http://www.ectstar.eu/Informationforvisitors/infoforvisitors.htm

The Organizing Committee

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