

# **4th International Workshop on Transverse Polarisation Phenomena in Hard Processes (TRANSVERSITY 2014)**

**EPJ Web of Conferences Volume 85#4237+**

**Chia, Italy  
9-13 June 2014**

**Editors:**

**U. D. Alesio**

**F. Murgia**

**ISBN: 978-1-63439-981-4**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution license:  
<http://creativecommons.org/licenses/by/2.0/>

**You are free to:**

**Share** – copy and redistribute the material in any medium or format.

**Adapt** – remix, transform, and build upon the material for any purpose, even commercial.

The licensor cannot revoke these freedoms as long as you follow the license terms.

**Under the following terms:**

You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. The copyright is retained by the corresponding authors.

Printed by Curran Associates, Inc. (2015)

For additional information, please contact EDP Sciences – Web of Conferences  
at the address below.

EDP Sciences – Web of Conferences  
17, Avenue du Hoggar  
Parc d'Activité de Courtabœuf  
BP 112  
F-91944 Les Ulis Cedex A  
France

Phone: +33 (0) 1 69 18 75 75

Fax: +33 (0) 1 69 28 84 91

[contact@webofconferences.org](mailto:contact@webofconferences.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>Phenomenology of TMDs</b> .....	1
<i>Melis Stefano</i>	
<b>Different Approaches to TMD Evolution with Scale</b> .....	9
<i>Collins John</i>	
<b>Orbital Angular Momentum: How to Define it and How to Measure it</b> .....	17
<i>Leader Elliot</i>	
<b>Deeply Virtual Compton Scattering and Exclusive Meson Production</b> .....	24
<i>d'Hose Nicole</i>	
<b>Status of DVMP, DVCS and GPDs</b> .....	38
<i>Kroll P.</i>	
<b>TMDs and Unpolarized SIDIS</b> .....	50
<i>Contalbrigo M.</i>	
<b>TMD and Spin Asymmetries in SIDIS</b> .....	59
<i>Bressan Andrea</i>	
<b>Transverse Single Spin Asymmetries in Hadronic Interactions: An Experimental Overview and Outlook</b> .....	69
<i>Bland L.C.</i>	
<b>Transverse Spin Effects in Future Drell-Yan Experiments</b> .....	80
<i>Peng Jen-Chieh</i>	
<b>Universality of TMD correlators</b> .....	87
<i>Buffing M.G.A., Mukherjee A., Mulders P.J.</i>	
<b>Limits of TMD Evolution in SIDIS at Moderate Q</b> .....	93
<i>Gamberg Leonard</i>	
<b>TMDs: Evolution, Modeling, Precision</b> .....	102
<i>D'Alesio Umberto, Echevarria Miguel G., Melis Stefano, Scimemi Ignazio</i>	
<b>Piecewise Linear Wilson Lines</b> .....	108
<i>Van der Veken Frederik F.</i>	
<b>Scale Evolution of Gluon TMDPDFs</b> .....	114
<i>Echevarria Miguel G., Kasemets Tomas, Mulders Piet J., Pisano Cristian</i>	
<b>Gluon Contribution to the Sivers Effect. COMPASS Results on Deuteron Target</b> .....	120
<i>Szabelski Adam</i>	
<b>Ideas in Transverse Spin Physics</b> .....	126
<i>Sivers Dennis</i>	
<b>Transverse Spin Effects and Holography</b> .....	129
<i>Teryaev Oleg</i>	
<b>Quark Orbital Angular Momentum</b> .....	132
<i>Burkardt Matthias</i>	
<b>Chiral Odd GPDs</b> .....	135
<i>Goldstein Gary R., Gonzalez Hernandez J. Osvaldo, Liuti Simonetta</i>	
<b>Wigner Functions and Quark Orbital Angular Momentum</b> .....	141
<i>Mukherjee Asmita, Nair Sreeraj, Ojha Vikash Kumar</i>	
<b>The Role of Three-gluon Correlation Functions in the Single Spin Asymmetry</b> .....	146
<i>Beppu Hiroo, Kanazawa Koichi, Koike Yuji, Yoshida Shinsuke</i>	
<b><math>A_N</math> in Proton-proton Collisions and the Role of Twist-3 Fragmentation</b> .....	151
<i>Pitonyak Daniel, Kanazawa Koichi, Koike Yuji, Metz Andreas</i>	
<b>Recent HERMES Results on Transverse-momentum Dependent Phenomena from Scattering Off Unpolarised Targets</b> .....	157
<i>Karyan Gevorg</i>	
<b>Transverse Momentum Effects in Unpolarised SIDIS at COMPASS</b> .....	160
<i>Makke Nour</i>	
<b>Phenomenology from SIDIS and <math>e^+e^-</math> Multiplicities: Multiplicities and Phenomenology - Part I</b> .....	167
<i>Bacchetta Alessandro, Echevarria Miguel G., Radici Marco, Signori Andrea</i>	
<b>Phenomenology of COMPASS Data: Multiplicities and Phenomenology - Part II</b> .....	173
<i>Anselmino M., Boglione M., Gonzalez H. J.O., Melis S., Prokudin A.</i>	
<b>COMPASS Results on the Transverse Spin Asymmetry in Hadron-pair Production in SIDIS</b> .....	178
<i>Braun Christopher</i>	

<b>New Results on Transverse Spin Asymmetries from COMPASS</b> .....	182
<i>Parsamyan Bakur</i>	
<b>Recent HERMES Results from Inclusive and Semi-inclusive Hadron Production</b> .....	189
<i>Van Hulse Charlotte</i>	
<b>The 6 GeV TMD Program at Jefferson Lab</b> .....	194
<i>Puckett Andrew</i>	
<b>Measurement of Collins Asymmetry in Inclusive Production of Pion Pairs at BaBar</b> .....	198
<i>Garzia Isabella, Anulli Fabio</i>	
<b>Monte Carlo Generators for Studies of the 3D Structure of the Nucleon</b> .....	203
<i>Avakian Harut</i>	
<b>Monte Carlo Methods for TMD Analyses</b> .....	209
<i>Schnell Gunar</i>	
<b>Dihadron Fragmentation Functions and Transversity</b> .....	218
<i>Radici Marco, Courtoy A., Bacchetta Alessandro</i>	
<b>Sivers Effect in Dihadron Electroproduction</b> .....	223
<i>Kotzinian Aram, Matevosyan Hrayr H., Thomas Anthony W.</i>	
<b>Transverse Momentum Distributions and Nuclear Effects</b> .....	229
<i>Pace Emanuele, Dotto Alessio Del, Kaptari Leonid, Rinaldi Matteo, Salmè Giovanni, Scopetta Sergio</i>	
<b><math>A_N</math> in Inclusive Lepton-proton Collisions: TMD and Twist-3 Approaches</b> .....	234
<i>Prokudin Alexei</i>	
<b>Transverse Single Spin and Azimuthal Asymmetries in Hadronic Collisions at PHENIX</b> .....	240
<i>Kleinjan David</i>	
<b>Transverse Single Spin and Azimuthal Asymmetries in Hadronic Collisions at STAR</b> .....	244
<i>Vossen Anselm</i>	
<b>On the Role of Quark Orbital Angular Momentum in the Proton Spin</b> .....	250
<i>Zavada Petr</i>	
<b>Azimuthal Asymmetries in <math>p\uparrow p \rightarrow \text{jet } \pi X</math></b> .....	256
<i>Pisano Cristian, D'Alesio Umberto, Murgia Francesco</i>	
<b>The JLAB 3D Program at 12 GeV (TMDs + GPDs)</b> .....	262
<i>Pisano Silvia</i>	
<b>Exclusive Processes at JLab at 6 GeV</b> .....	267
<i>Kim Andrey</i>	
<b>Overview of HERMES Results on Exclusive Processes</b> .....	272
<i>Movsisyan Aram</i>	
<b>Polarised Drell-Yan Measurements at COMPASS</b> .....	278
<i>Chiosso Michela</i>	
<b>Future Results on Fragmentation Functions from BESIII</b> .....	282
<i>Guan Yinghui, Garzia Isabella, Li Haibo, Lyu Xiao-Rui, Yan Wenbiao</i>	
<b>Spin Physics and TMD Studies at A Fixed-Target Experiment at the LHC (AFTER@LHC)</b> .....	286
<i>Lansberg J.P., Anselmino M., Arnaldi R., Brodsky S.J., Chambert V., den Dunnen W., Didelez J.P., Genolini B., Ferreiro E.G., Fleuret F., Gao Y., Hadjidakis C., Hrvinacova I., Lorcé C., Massacrier L., Mikkelsen R., Pisano C., Rakotozafindrabe A., Rosier P., Schienbein I., Schlegel M., Scomparin E., Trzeciak B., Uggerhøj U.I., Ulrich R., Yang Z.</i>	
<b>Spin Physics Experiments at NICA-SPD with Polarized Proton and Deuteron Beams</b> .....	292
<i>Savin I., Efremov A., Peshekhonov D., Kovalenko A., Teryaev O., Shevchenko O., Nagajcev A., Guskov A., Kukhtin V., Toplilin N.</i>	
<b>Moving Forward in the Era of Quantitative QCD: Transversity 2014 Closing Remarks</b> .....	296
<i>Aidala Christine A.</i>	
<b>Author Index</b>	