

PREFACE

Transversity 2014 is the fourth in a workshop series on “Transverse polarisation phenomena in hard processes”. The previous three editions were held respectively in Como (2005), Ferrara (2008), Italy, and in Veli Losinj (2011), Croatia. This workshop series, originally born as an outcome of an Italian research project financed by the Italian Ministry of Education (MIUR) involving several theoretical and experimental research groups in the field of spin and hadron physics (Cagliari, Como, Ferrara, Frascati, Pavia, Perugia, Roma, Torino, Trieste), has become, given its success, a stable meeting with triennial frequency.

Transversity and transverse-spin effects in high-energy hadronic collisions are of ever-growing theoretical and experimental interest within the particle physics community. Modern developments in hadron physics emphasise the role of parton intrinsic motion and spin, and their correlations, which are crucial for a full understanding of the nucleon structure in terms of quark and gluon degrees of freedom in QCD, beyond the collinear approximation.

The main aim of these workshops is to provide an environment in which present theoretical and experimental knowledge in the field of transversity, transverse-momentum dependent distribution and fragmentation functions (shortly referred to as TMDs) as well as generalised parton distribution functions (GPDs) can be presented and discussed in depth, together with new theoretical ideas and experimental perspectives.

They represent a valuable opportunity to gather the spin physics community, with a broad participation of theorists, as well as of experimentalists working in international collaborations at BNL, CERN, DESY, JLab, KEK and SLAC, all deeply involved in this area of research.

These workshops are also a unique occasion for young researchers to be informed on the state-of-the-art of this fast-developing research field, and to present and discuss their own work and projects in a highly stimulating and reactive context.

In the last three years several new experimental results and theoretical achievements have become available. On one side, they have allowed us to deepen our knowledge of many aspects of spin physics and TMDs. On the other side, they have also opened new perspectives, and put new questions and challenges concerning, e.g., transverse momentum dependent (TMD) factorization theorems and universality, the process dependence of TMDs and their evolution with scale, the phenomenology of TMDs in the light of the ever growing amount of experimental data available on single spin and azimuthal asymmetries, hadron multiplicities, and so on.

All these topics have been discussed in depth at the workshop, with the aim of setting the stage for the present situation of the field and discuss and formulate common ideas and perspectives about the developments of the research area in the next years.

About 70 physicists took part in the workshop, 30% of them italians and 70% from abroad, almost equally distributed among theorists and experimentalists. There was a total of 58 invited contributions, with 12 review talks, 46 research talks and 2 round-table discussions focused respectively on global fits of TMDs and the impact of TMD evolution, and on Monte Carlo methods and TMD extraction.

The success of this workshop is almost entirely due to participants and speakers, whom we gratefully acknowledge for the high quality of their presentations and for the active and stimulating participation to question sessions and to discussions.

The fifth edition of “Transversity” will be held in Frascati, Italy, in 2017.

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