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## COMPASS results on the nucleon spin structure

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The COMPASS experiment at CERN is one of the leading experiments studying the nucleon spin structure. These studies are being carried on since 2002, by measuring hadrons produced in deep inelastic scattering (DIS) of 160 GeV/c and 200 GeV/c polarized muons off different polarized targets. One of the main goals is to determine how the total longitudinal spin projection of the nucleon,  $1/2$ , is distributed among its constituents, quarks and gluons. Regarding this topic the latest results from COMPASS on the quark and gluon helicity will be shown. Another major goal, whose fulfillment is needed for a complete understanding of the nucleon structure, is the determination of the transverse momentum dependent parton distributions (TMDs). An overview of the TMD results from semi-inclusive DIS will also be presented. In 2015 COMPASS scattered a negative pion beam of 190 GeV/c off a transversely polarized proton target, with the goal of accessing the TMDs of both hadrons without any prior knowledge on fragmentation functions. This was the first ever polarized Drell-Yan (DY) experiment with a pion beam. Since the DY data covers part of the DIS kinematic region, COMPASS has the unique opportunity to test the sign change of the Sivers TMD as predicted by QCD. This is a crucial test to the formalism of non-perturbative QCD. Preliminary results will be shown. Finally, the COMPASS plan to measure generalized parton distributions (GPDs) is also discussed. The first GPD run was taken in 2016.

### Biography

Celso Franco has graduated in Physics from the University of Lisbon in 2005 and has completed his PhD degree in Experimental Particle Physics from the Technical University of Lisbon in 2011. During the PhD, he has worked in the highly competitive scientific environment of the COMPASS experiment at CERN. Currently, he works as a Post-doctorate fellow for the COMPASS and HADES experiments. He is co-author of 47 articles published in peer review journals and is single author of 9 conference proceedings. His h-index is 21. In 2016, he was nominated for the Altarelli prize for Junior Scientist.

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