

## **Study of the partonic structure of the nucleon at the COMPASS experiment**

COMPASS is a fixed target experiment at the CERN SPS. It has been, together with HERMES (at DESY), a pioneering experiment in the study of the transverse momentum and transverse spin partonic structure of the nucleon, a hot topic in hadron physics. Measuring deep inelastic scattering (DIS) of high energy muons off unpolarised and transversely polarized nucleons, COMPASS produced new experimental results well described in the recently developed QCD framework which takes into account the transverse degrees of freedom of the partons. One of the most relevant findings is that transversity (one of the three parton distribution functions needed to describe the nucleon at leading order, the one related to the tensor charge, a fundamental quantity) is different from zero. Presently COMPASS is starting the data taking using a transversely polarized deuteron target. These data, which will remain unique for several years, will allow to measure the properties of the d quarks and will allow for a remarkable improvement in the knowledge of the tensor charge, concluding the exploratory COMPASS program. The PhD project will include the new deuteron data analysis existing, and will focus on technical aspects, phenomenological interpretation of the results, or perspectives for measurements at future facilities, as EIC and JLab24 in the US, accordingly to the specific interest of the student. The work will be done inside the Trieste COMPASS group, in close collaboration with researchers of the COMPASS Collaboration (an international Collaboration consisting of about 200 physicists) and with theoreticians expert in the field.

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