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The Spin Physics Detector (SPD) at the NICA Collider: Status and Outlooks

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The Spin Physics Detector (SPD) is a universal detector at the NICA collider under commissioning at JINR, Dubna. The SPD is intended to study the spin structure of the proton and deuteron and other spin-related phenomena using a unique possibility to operate with polarized proton and deuteron beams at a collision energy up to 27 GeV and a luminosity up to $10^{32} \text{ cm}^{-2} \text{ s}^{-1}$. As the primary goal, the experiment aims to provide access to the gluon TMD PDFs in the proton and deuteron, as well as the gluon transversity distribution and tensor PDFs in the deuteron, via the measurements of specific single and double spin asymmetries using different complementary probes such as charmonia, open charm, and prompt photon production processes. Other polarized and unpolarized physics is possible, especially at the first stage of NICA operation with reduced luminosity and collision energy of the proton and ion beams. The physics program of the SPD and the design of the SPD setup will be presented.

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