# Referee report on the project
## "CONCEPTUAL AND TECHNICAL DESIGN OF THE SPIN PHYSICS DETECTOR (SPD) AT THE NICA COLLIDER"

Problem of the spin structure of nucleons is one of the essential problems of understanding the properties of strong interaction. Despite the progress achieved during the last decades in the understanding of the quark contribution to the nucleon spin, the gluon sector is much less developed.

The (un)polarized gluon content of the proton and deuteron at intermediate and high values of Bjorken *x* is planned to be investigated at the SPD experiment using three main probes: the inclusive production of charmonia, open charm, and prompt photons. Collisions of protons and deuterons with CMS energy up to 27 GeV and luminosity up to $10^{32}$ $cm^{-2}$ $s^{-1}$ at NICA will be used for that.

The study of these processes is complementary to the usual approaches to access the partonic structure of the nucleon in hadronic collisions such as the inclusive production of hadrons at high transverse momentum and the Drell-Yan process. For an efficient detection of the aforementioned gluon probes, the SPD setup is planned to be equipped with muon-identification system, an electromagnetic calorimeter, a time-of-flight system, and a silicon vertex detector and a focusing aerogel RICH detector. Nearly a 4π coverage of the setup and a low material budget in the inner part of the setup should provide a large acceptance for the detection of the desired final states. A separate intensive program is envisaged for the first phase of the experiment with reduced luminosity and collision energy of the proton and ion beams.

The detailed physics program of the experiment has been presented in two papers and looks very reasonable and is a continuation of many years of work at JINR in this direction. The Technical Design Report presented by the SPD group is highly complete and demonstrates a sufficiently deep elaboration of the technical and engineering issues associated with the construction and assembly of the detector. At the moment this document is under review of the International Detector Advisory Committee.
I believe that the project will be successfully implemented, provided sufficient and timely funding. This is hoped for by the skilled teams from the four JINR laboratories involved in the project, as well as by the success of the SPD international collaboration.

Based on the above, I have no doubt to propose to prolongate the project " Construction of the Spin Physics Detector for studying spin effects in nuclear interactions" within the framework of theme 1065 for a period 2025-2029 years with the first priority.

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