

## Optimization of the operating mode of the NICA collider for experiments at SPD: studying the effect of impedance on the dynamics of an intense proton beam

*Monday, 15 April 2019 18:00 (15 minutes)*

The studies of the nucleon spin structure in the collisions of polarized proton beams is the first priority task for the scientific program of The Spin Physics Detector (SPD) project at the NICA facility.

Effective carrying out of these studies is possible with the luminosity of p-p collisions =  $1(10)^{32} (cm)^{-2} c^{-1}$  at the energy  $E_{cm} = 27 GeV$ . This is possible with the accumulation of the  $\sim 2(10)^{13}$  particles in each of the rings of the collider NICA.

In the report the condition for the implementation of a such regime and the effect of impedance on the total allowed incoherent betatron tune shift are described.

The main part of the report gives examples of the calculation of the impedance for the elements which are parts of the arch of the collider NICA.

The problem of calculating the effective impedance of the structure and its influence on the betatron beam motion, which is important for obtaining the largest luminosity of the collider, are considered.

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**Session Classification:** Particle accelerators and nuclear reactors

**Track Classification:** Particle Accelerators and Nuclear Reactors