

Dynamic aperture calculations for the NICA booster

Modern accelerators are made with high-field superconducting dipole, quadrupoles and sextupoles that exhibit unintentional imperfections of the guiding field-shape due to construction tolerances, persistent currents and magnetic saturation. This deviation from linearity has a profound influence on the beam dynamics. In this work the research of nonlinear beam dynamics for the NICA booster was carried out. Sextupole and octupole fields, according to ongoing magnetic measurements, were taken into account. Numerical simulation in MADX program has been used to evaluate the dynamic aperture for booster. In addition, betatron tune shift with amplitude was calculated. The results showed that dynamic aperture is exceeded its geometrical acceptance at least in two times.

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