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Towards Fast-Pulsed Superconducting Synchrotron Magnets*

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The concept for the new GSI accelerator facilities is based on a large synchrotron designed for operation at BR= 200 Tm and with a short cycle-time of about one second to achieve high average beam intensities. Superconducting magnets may reduce considerably investment and operating costs in comparison with conventional magnets. An R&D program was initiated to develop these magnets for a maximum field of 2-4 Tesla and a ramp rate of 4 T/s. In collaboration with JINR (Dubna) the window-frame type Nuclotron dipole, which has been operated with 4 T/s at a maximum field of 2 Tesla, shall be developed to reduce heat losses and to improve the magnetic field quality. Another collaboration with BNL (Brookhaven) was established to develop the one-layer-coil $\cos\theta$ -type RHIC arc dipole designed for operation at 3.5 Tesla with a rather slow ramp-rate of 0.07 T/s towards the design ramp-rate of 4 T/s. The design concepts for both R&D programs are reported. In addition new magnet designs are discussed, as for example $\cos\theta$ -coils or block-type-coils with indirectly cooled Nuclotron cable.

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