

Design of 6 T superconducting dipole for SPS upgrade

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One of the options being considered for the FCC-hh high energy injector is a superconducting machine replacing the SPS, so to increase the energy from the current 450 GeV to 1.3 TeV. This synchrotron would operate in a cycled mode also to feed experimental areas, much like the SPS nowadays. Due to this specific cycled operation, innovative design and development approaches will be required to cope with the AC losses in the superconducting cables and reaching the highest possible critical wire and cable critical current. Some of the other design parameters of the model are the following: aperture - 80 mm diameter; the field ramp rate of 0.2 - 0.5 T/s; the wire - NbTi @1.9 K; the total thermal losses less of 2 W/m at 4.2 K equivalent while ramping. The design is started. Possibilities of a single layer cosine (θ) dipole with the yoke at intermediate temperature are analyzing.

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