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Electromagnetic Design of a 6 T Cos-theta Fast Cycling Dipole Model

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A Cos-theta type fast cycling dipole model for synchrotron is being developed at IMP. The magnetic field of the dipole is 6 T with maximum ramp rate is 1 T/s. The coil inner diameter is 80 mm and two-layer coils are used to produce accelerator field quality in two third of coil aperture. Rutherford cable with 316L stainless steel core is used to reduce the inter-strand couple loss. Low loss NbTi wire with 2~3 um filament diameter and CuMn/ CuNi matrix has been chosen for the magnet. This paper will report the Rutherford cable design, 2D cross section magnetic field optimization and coil end design.

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