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ENLARGED BORE 11.74T MAGNET FOR BRAIN RESEARCH APPLICATION

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Ultra-high field magnets are becoming fundamental in brain research in order to satisfy the higher requirements in tissue contrast, spectral resolution and signal to noise ratio. ASG is putting a lot of effort to be competitive in this sector. After a 7 T conceptual design (1) , now ASG is working on an 11.74 T MRI magnet for the Gachon University GIL Hospital.In this project, ASG has the responsibility of the complete magnet design, of the manufacturing and of the installation. A wax impregnated Nb-Ti superconductive compensated solenoid configuration has been selected to reach the ultra-high field value. In order to compensate the field inhomogeneity, additional superconductive coils are installed to perform active shimming, while to respect the fringe field restrictions a passive shield system has been optimized. Lorentz forces and coil interactions produced by the magnet have been calculated in order to verify mechanical structure and stresses on the coils. The whole magnet is working in helium bath and the radiation load is reduced using several thermal shields, cryocooler cooled. The system overall length of 3 meter is reached with an overall weight less than 60 tons. Compared to the actual head MRI magnets, a larger bore (700 mm) will characterize the developing magnet. This feature can make the patient access more comfortable and make higher the comfort level.
(1) S. Cuneo, A. Capelluto, R. Marabotto, G. Masullo and G. Salvitti, “Design of a compact 7T Nb-Ti superconducting magnet for MRI application” MT24, 2015.

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