

Scientific Session IV

Current Status on Development of 3.0T MRI System & Clinical Applications of MR Spectroscopy

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The initial experience of world first 3.0T active shield magnet during the development of whole body MRI will be presented.

A 3.0 Tesla active shield magnet designed by Oxford Magnet Technology was installed at the Catholic Medical School in July 1997. The dimensions of active shield magnet are 2575mm height, 2347mm length, 2208 mm width, 7500kg weight and 840mm horizontal bore inner diameter. The 24 channel passive room temperature shim trays are imbedded in the active shield gradient coil assembly. The six channel room temperature shim coils are wound onto the outer shell of active shield gradient coil of which outer and inner diameters are 838mm and 600mm, respectively. The operating current was 563.8 Amps. The six channel higher order shim coils in addition to the three axes linear coils are added for the correction of Z₂, ZX, ZY, XY, X₂-Y₂, Z₀ term harmonics to ensure the internal specification of 0.03ppm half height line width (HHLW) over 22 cm d.s.v. The liquid helium reservoir capacity is 2255 liters. The helium circulation system is equipped with a Leybold Model ARW 6000 two stage refrigerator with RW 6600 compressor unit.

While the final performance of passive shim magnet can only be assessed after the installation of yoke and ferro-magnetic shield on site, the performance of active shield 3.0T magnet has not been changed significantly since the factory acceptance test. Furthermore, over the 18 months uses of active shield 3.0T magnet, we have not had any serious problem such as an unexpected magnetic quench. Our initial experience may suggest that the active shield 3.0T magnet can works flawlessly in the clinical situation and appears to be proper choice for the high field magnetic resonance applications such as the spectroscopy and functional imaging