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Development of A Half Size 3T REBCO Superconducting Magnet for MRI

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Research and development for the practical application of a medical-use magnetic resonance imaging system (MRI) superconducting magnet that requires without liquid helium started as the New Energy and Industrial Technology Development Organization's (NEDO) supported project in fiscal 2016. Development of a liquid helium-free medical MRI superconducting magnet is desired. Another purpose is to reduce the size and weight of high magnetic field magnets. By using the high temperature superconducting coil, it is possible to make the 3T magnet as shape, weight, leakage magnetic field as 1.5T magnet. In this project, we are developing a half size active shield-type 3T REBCO coil for MRI. This magnet has active shield coils with a maximum diameter of 1200 mm, and the room bore diameter is 480 mm. This magnet is one of the largest in the world as a magnet using a REBCO wire with an accumulated energy of 1.6 MJ at the rated magnetic field. It is a magnet system with magnetic field uniformity and magnetic field stability necessary for imaging. In this paper, we report the half-size active shield-type 3T coil and the cooling system that can reduce the initial cooling time.

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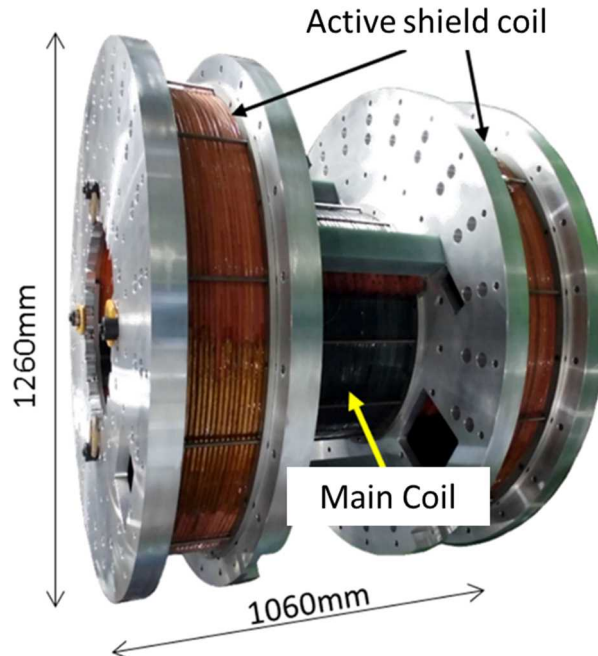


Fig.1 Photograph of half-size REBCO superconducting coil for MRI with active shield coils.

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