

Development of Muon Rotating Target at J-PARC/MUSE

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The most intense pulsed muon beam will be generated by a 3-GeV 333-microA proton beam on a muon target made of 20-mm thick isotropic graphite (IG-430) at J-PARC/MUSE (Muon Science Establishment). The energy deposited by a 1-MW proton beam is estimated to be 3.9kW on the muon target. The first muon beam was successfully generated on September 26th, 2008. Gradually upgrading the beam intensity, continuous 300-kW proton beam has been operated since January of 2013. The current muon target with a fixed target method, called “muon fixed target”, has been utilized without replacements since the first muon beam generation. Proton irradiation gives radiation damage to material properties. In particular, the effect to the dimension is significant for our case. The lifetime of the muon fixed target will be less than 1 year by the proton-irradiation damage of the graphite in case of 1-MW proton beam operation. To extend the lifetime, the developments of the muon rotating target, in which the radiation damage is distributed to a wider area, had been started since 2008 in parallel with the proton beam operation. The developments, such as the analyses, the detailed designs, and durability tests with a heating and rotating mock-up were completed. The muon rotating target will be installed in the scheduled long-shutdown of 2014. The development of the muon rotating target at J-PARC/MUSE will be described in this presentation.

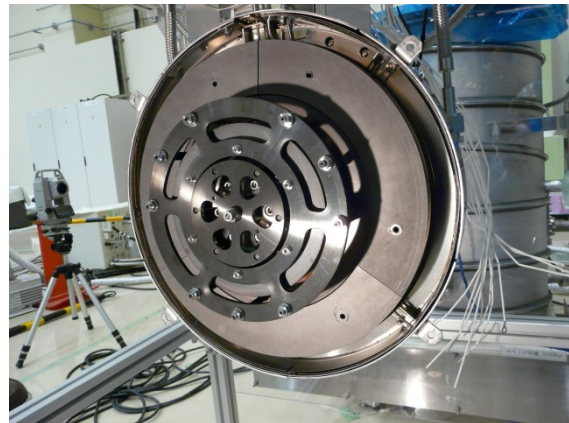
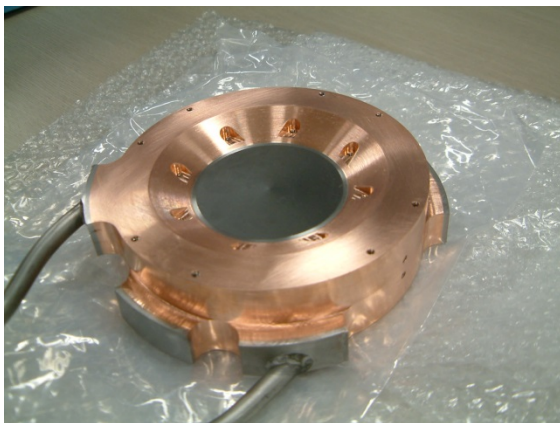


Fig.: Pictures of the muon fixed target on the left and the muon rotating target on the right.