

Upgrade of a Dipole and Triplet Magnet for D-line at J-PARC MUSE

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The bending magnet DB2 and triplet magnet D1-triplet (DQ10-11-12) are installed in the decay muon beamline (D-line) at the Materials and Life Science Facility (MLF) of J-PARC. DB2 is a dipole magnet, and over 40 years have passed since its production. Therefore, we planned to exchange the degraded coils for new ones within three years. After the coil replacement, we measured the magnetic field with a hall probe to compare the magnetic field measurement before and after the coil replacement [1]. As for the D1-triplet, the old D1-triplet could only transport muons with momentum up to 67 MeV/c because of the magnet cooling water and power supply specification limitations. But we had been requested by users for high muon momentum as high as 90 MeV/c. So, we decided to upgrade the D1-triplet and its power supply. They were exchanged, and new current values that resulted in the same GL product and distance between magnet centers were determined so that the beam optics would not change before and after the exchange. Commissioning was performed at 30MeV/c; the current values from the optimization calculations were compared with those obtained after beam commissioning [2]. The details of the upgrade will be presented at the conference.

References

- [1] T. Yuasa et al., Muon Beamlines and Control System, KEK-MSL REPORT 2021, KEK Progress Report 2022-7 (February 2023), pp. 15-18.
- [2] T. Yuasa et al., Muon Beamlines Magnets and Power Supplies Update, KEK-MSL REPORT 2022, KEK Progress Report 2021-6 (February 2024), pp. 10-11.