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## **Thu-Af-Or23-05: Excitation Test of Superconducting Magnet for 230MeV Isochronous Cyclotron for Proton Therapy**

*Thursday 26 September 2019 17:30 (15 minutes)*

We are developing a superconducting isochronous cyclotron for proton therapy. Its yoke weight is about 65 tons, which is less than one third of our normal-conducting 230 MeV cyclotron. The split pair superconducting coils using NbTi wire are conduction-cooled by four 4 K Gifford-McMahon cryocoolers. Pure iron magnetic poles have deep valleys and four sectors with higher spiral angles than 60 degree. Designed average field is 4 T on extraction radius. We have achieved the nominal magnetic field generation without quench. We measured actual current dependence of inductance, and it agreed on computation. Forced quench test were performed to test protection circuit. Protection of the magnet was successful, and recovery time of the magnetic field generation was 17 hours.

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