

**Design Study of Sector Magnet for the RIKEN Ring Cyclotron (II),** S. FUJISHIMA, A. GOTO, K. IKEGAMI, T. KAWAGUCHI, J.W. KIM, T. KUBO, T. MITSUMOTO, H. OKUNO, Y. TANAKA, T. TOMINAKA, and Y. YANO, RIKEN

- The superconducting ring cyclotron that is proposed for RIKEN RI Beam Factory consists of six identical sector magnets, each of which produces a magnetic field of 4.5 T at the maximum. Superconducting main coils and trim coils are adopted to reduce the cyclotron size and save electric power. Yokes and poles that are made of soft iron are also used to reduce the ampere turns of coils and leakage magnetic flux. Main parameters of the sector magnet are as follows: the beam injection radius is 2.37 m and the beam extraction radius 5.36 m; the sector angle is 25 deg.; the weight of each magnet is 900 tons; the maximum main coil current is 5000 A and the maximum trim coil current 500 A; the ampere-turn of the main coil is 6 MA per each magnet; and the total stored magnetic energy of six magnets is 1.1 GJ. The sector magnet features cold-pole arrangement. In this arrangement the main coil is wound on the cold pole directly and the distance between the main coil and the pole can be made short. The expanding force on the main coil can thus be reduced to one third of that in warm-pole arrangement.