

Synchrotron Design Issues of the Japanese Hadron Project, Y. MORI and JHP SYNCHROTRON DESIGN GROUP, INS and KEK - The accelerator complex of the Japanese Hadron Project (JHP) will consist of 200 MeV proton linear accelerator, 3 GeV fast cycling booster synchrotron, and 50 GeV main synchrotron. The average beam current of the booster synchrotron will be 200 μ A and that of the main ring will be 10 μ A, respectively. They are realized by 25 Hz repetition of an acceleration cycle with 5×10^{13} particles per pulse (ppp) in the booster and 0.3 Hz of that with 2×10^{14} ppp in the main ring. One of challenging issues of those synchrotrons is the injection, acceleration, and extraction (both slow and fast mode) of high beam current with minimum beam loss. Heavy beam loading has to be overcome in the longitudinal plane and space charge effects and other collective beam instabilities should be cured in the transverse planes. Topical hardware R&D's have been already initiated, which include i) rf acceleration system against heavy beam loading, ii) resonant power supply with multi-network for 25 Hz (50 Hz in future) operation, iii) ceramic beam chamber against eddy current with good rf shieldings to reduce coupling impedance. The machines will be built in the north campus of the KEK.