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## A Heavy-ion Program at J-PARC

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In J-PARC, possibility of a future heavy-ion program has been discussed.

There are two physics subjects included in the program. One is a low energy heavy ion physics, to study unstable nuclei with the linac beam at 1-10 AMeV/c, and the other is a high energy heavy ion physics to explore nuclear physics at a high baryon density with the Main Ring beam at 1-10 AGeV/c. In this work, the latter is presented.

We discuss a heavy ion accelerator scheme, physics goals, and an experimental set-up. The accelerator scheme includes a new heavy ion linac, with or without a new heavy ion booster ring, and utilizes the existing 3 GeV Rapid Cycling Synchrotron, and 30 GeV Main Ring.

We focus on studies of dilepton measurements, exotic hadrons such as the H-dibaryon and exotic nuclei such as hypernuclei. The enhancement of dilepton in the low mass region (below rho mass) tends to having a maximum around the J-PARC energies where the highest baryon density coincides. The yield of hypernuclei has also maximum in this energy region due to coalescence of high density baryons.

We designed a 4-pi acceptance heavy-ion spectrometer which consists of a solenoid spectrometer detecting backward hadrons and a dipole spectrometer detecting middle and forward hadrons and leptons. Performance of the spectrometer is evaluated with simulations.

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