



Contribution ID: 454

Type: **Parallel Talk**

Studies of extremely dense matter in heavy-ion collisions at J-PARC

Wednesday, 16 May 2018 15:00 (20 minutes)

We aim at studies of dense matter as a future project of J-PARC (J-PARC-HI), in fixed target heavy-ion collision experiments at 1-19 AGeV/c. We are going to search for the QCD critical end point and the first order phase boundary. The dense matter created at J-PARC-HI has a density of 5-10 times as high as the normal nuclear density similar to neutron stars and neutron star mergers. Therefore, we aim at studying the properties of dense matter related to them, in particular the equation of state (EOS). Recently, neutron merge has been observed with gravitational wave, and the result already limited the region of the EOS. We aim at constraining the EOS also in heavy-ion collisions. We expect to produce world's highest rate heavy-ion beams of 10^{11} with the ion species from p to U. The heavy-ion acceleration will be realized by introducing a new injector consisting of a linac and a booster ring, and utilizing existing 3-GeV and 50-GeV synchrotrons (RCS and MR, respectively). MR has achieved acceleration of 4.3×10^{13} protons per pulse at 30 GeV is going to achieve the designed rate of 1.2×10^{14} in 2019.

We design a multi-purpose spectrometer to measure dileptons, photons, and hadrons, and a spectrometer dedicated to hypernuclear measurements. In this talk, we will optimize the detector configurations and evaluate some of key performance of the spectrometers, such as dilepton and photon measurements, neutron measurements for event-by-event fluctuations, and hypernuclear measurements based on realistic simulations. We also report the R&D status on such as a Time-of-Flight counter based on MRPC (Multi Resisitive Plate Chambers) and a triggerless fast data-acquisition system.

Content type

Experiment

Collaboration

J-PARC-HI Collaboration

Centralised submission by Collaboration

Presenter name already specified

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Session Classification: Future facilities, upgrades and instrumentation

Track Classification: Future facilities, upgrades and instrumentation