

Exploring high-density baryonic matter in J-PARC-HI Project

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J-PARC is one of the world's highest-intensity proton accelerators for material and life sciences, neutrino physics, and hadron and nuclear physics in the GeV energy region. We are planning to accelerate world's high-intensity heavy-ion beams at J-PARC. We will build a new compact heavy-ion linac and a booster ring as an injector, while we utilize the existing RCS and MR synchrotrons to accelerate up to 10^{11} Hz heavy-ion beams at 1-12 AGeV/c. We will explore QCD phase structures in a high-baryon density regime such as the first-order phase boundary and the QCD critical point, and QCD superconducting phases. We also search for various multi-strangeness particles/nuclei and studying hadron interactions including strangeness. In this presentation, we will show the staging strategy of J-PARC-HI with the existing primary proton beam line and the J-PARC E16 spectrometer (Phase 1), and upgrade of the booster ring with the extension of the proton beam line and the construction of the new large acceptance spectrometer (Phase 2). We show the status of the dilepton measurements in p+A collisions at J-PARC E16, which has started since 2020. Then, we will show some of the physics feasibility for dilepton and hadron measurements with Phase 1 and Phase 2.

Theory / experiment

Experiment

Group or collaboration name

J-PARC-HI Collaboration

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