STAR Highlights

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Abstract

STAR is a multipurpose detector with excellent particle identification capabilities, operating at Relativistic Heavy Ion Collider (RHIC) at BNL. Recently, STAR has completed data taking for the second phase of the Beam Energy Scan program at RHIC (BES-II) and the Isobar collisions program. The BES-II program includes dedicated low beam energy runs and a fixed-target program to include the energy range $\sqrt{s_{NN}}$ = 3 -19.6 GeV/c^2, allowing for exploration of the high baryon density region of the QCD physics. With new datasets and dataset from U+U and d+Au collisions, STAR collaboration will present a series of measurements related to charged particles, strange hadrons, heavy quarks, dielectrons, light nuclei as well as hypernuclei. Detectors for BES-II and a dedicated Forward Upgrades have been fully commissioned and operated successfully in 2022 and 2023. STAR has proposed the high statistics p+p and Au+Au runs in 2023-25 to investigate the microstructure of Quark-Gluon Plasma (QGP) and the unique forward cold QCD physics. The impact of these research on physics will also be discussed.