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## Experimental results on hot and dense matter physics in heavy ion reactions

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The main goal of the relativistic heavy-ion reaction experiments is to study the phase structure of the QCD phase diagram. Experiments at the Relativistic Heavy Ion Collider and Large Hadron Collider Facility have produced a QCD matter with quark and gluon degrees of freedom –quark-gluon plasma (QGP). In this talk, we review the recent measurements related to mapping the phase diagram of QCD, large initial magnetic field, the polarization of QGP, and search for novel phenomena of Chiral Magnetic Effect. We also discuss the observation of significant collectivity in small systems relative to those observed in heavy-ion reactions, new results on investigation of QGP properties through measurements of heavy-flavor hadrons and tagged jets, and exciting possibilities like light-light scatterings in ultra-peripheral heavy-ion reactions. Finally, as an outlook, we discuss the movement of the field towards an experimental investigation of high baryon density matter at lower collision energies and precision measurements of properties of QGP through high luminosity running of facilities at higher energies.

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