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**Deconfined phase of QCD and thermodynamics of the quark-gluon plasma**

LUDMILA LEVKOVA, University of Utah

The quark-gluon plasma is a state of matter which forms at very high temperatures or densities. It is believed that up to microseconds after the big bang the quark-gluon plasma was a dominant component of the Universe. This state of matter is recreated in heavy-ion collision experiments (such as RHIC and ALICE) which study its formation and transition to ordinary matter. Knowledge of the properties of the quark-gluon plasma is essential to our understanding of the particle spectra produced in these experiments, and also for phenomena related to cosmology and compact star formation. I present recent results for the thermodynamics of the quark-gluon plasma from lattice QCD, which is the only nonperturbative method currently allowing its first principle determination.