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Particle Production and Bulk Fireball Properties in $\sqrt{s_{NN}}$ = 130 and 200 GeV Au–Au Collisions GIORGIO TORRIERI, McGill U, JEAN LETESSIER, LPTHE-Paris7, JOHANN RAFELSKI, U Arizona — We study within the statistical hadronization model the fireball of matter created at RHIC in 5% most central $\sqrt{s_{\rm NN}} = 130$ and 200 GeV Au–Au collisions. We evaluate six model variants: chemical equilibrium, strange quark non-equilibrium, and general flavor yield non-equilibrium where in each case we study hadronic resonances with, and without a width weight. The broad data set we consider includes most stable particles and many short-lived resonances. The precision of the best fit for both stable and unstable hadrons is comparable, with resonances considerably reducing the fitted parameter error. The statistical significance analysis favors an over saturated quark abundance. We determine collision energy dependence of rapidity yields of energy, strangeness, entropy, baryon number, and of physical properties. We search for universal thermal bulk properties that do not vary with collision energy. The bulk properties of the hadronizing fireball, as well as features of the equation of state are remarkably collision energy-independent, suggesting that the system's degrees of freedom and freeze-out conditions do not vary between $\sqrt{s_{\rm NN}} = 130$ and 200. We show that consideration of certain experimental resonance yields allows a great enhancement in precision of our analysis outcome.

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