Balance Functions from Au+Au Collisions at $\sqrt{s_{NN}} = 7.7$ to 200 GeV

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— We present balance functions from Au+Au collisions at $\sqrt{s_{NN}} = 7.7$ to 200 GeV measured at STAR and compare with recent results for Pb+Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV [1]. We find that the balance function narrows as the collisions become more central and as the incident energy increases, which is consistent with the concept of delayed hadronization of a deconfined quark-gluon plasma (QGP). We also present balance functions for $\pi^+\pi^-$ pairs, $K^+K^-$ pairs, $p\bar{p}$ pairs, and $pK^-$ pairs from central Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. We compare to a model [2] that relates these balance functions to the correlations of up, down, and strange quarks in the QGP created in central Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. Our results are consistent with two waves of charge creation in time, one early in the collision ($\sim 1$ fm/$c$) and a second at hadronization ($\sim 5 - 10$ fm/$c$). We find that the densities of up, down, and strange quarks in the QGP extracted from the model comparison are consistent with current lattice gauge calculations.