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Bulk Properties of the medium in Ru+Ru and Zr+Zr Collisions at $\sqrt{s_{NN}} = 200$ GeV with STAR detector

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Understanding the bulk properties of matter produced in heavy-ion collisions is crucial for probing the dynamics and phase transitions of Quark-Gluon Plasma. We present measurements of $\pi^{\pm}$, $K^{\pm}$, p, $\bar{p}$, Λ, $\bar{\Lambda}$, Ξ and $\bar{\Xi}$production in Ru+Ru and Zr+Zr collisions at $\sqrt{s_{NN}} = 200$ GeV using the STAR detector. Transverse momentum (p_T) spectra are analyzed to extract particle yields (dN/dy), yield ratios, and mean transverse momentum ($\langle p_T \rangle$) at mid-rapidity, probing the properties of the produced medium. The p_T distributions are fitted with a blast-wave function to extract kinetic freeze-out parameters and to study the possible effects of incomplete thermal equilibrium. Chemical freeze-out conditions are extracted using the THERMUS thermal model. Key parameters are compared across different collision systems using published data. These results enhance our understanding of bulk matter properties in heavy-ion collisions.

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