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Study of Thermodynamic and Transport Properties of Strongly Interacting Matter in a Color String Percolation Approach at RHIC energies

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The phase transition of a strongly interacting matter from hadron to a quark-gluon plasma state have received considerable interest. In the color string percolation phenomenology the interactions between the strings occur in the initial stage of the collisions. This frame-work naturally predicts the reduction in the charged particle multiplicity and the enhancement of the transverse momentum with respect to the value expected from the number of independent strings. The initial temperature and energy density are obtained from the data via the color reduction factor $F(\xi)$ and the associated string density parameter ξ. The shear viscosity to entropy density ratio(η/s), trace anomaly(Δ) ,the squared speed of sound (C_S^2), entropy density, bulk viscosity to entropy density ratio(ζ/s) are extracted using Color String Percolation Model (CSPM) for STAR data at various RHIC energies from $\sqrt{s_{NN}}$ = 7.7 to 200 GeV. Results are in agreement with the lattice QCD calculations for (2+1) flavour. The initial temperatures obtained by CSPM are compared with various hadronization and chemical freeze-out temperatures. This analysis shows that the deconfinement to confinement transition possibly takes place between $\sqrt{s_{NN}}$ = 11.5 and 19.6 GeV.

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