Transport Coefficient of Gluon Plasma from Lattice QCD

Presenter: Sunao Sakai
Sunao Sakai and Atsushi Nakamura

Abstract: RHIC is now confirming the discovery of the "New State of Matter", which is far from the free gas state, and has very small viscosity. It is now highly desired to calculate the value of the viscosity. We report our calculation of the transport coefficients of gluon system on $24^3 \times 8$ and $32^3 \times 8$ lattices in the quench approximation. Simulations are carried out at $1.4 \leq T/T_c \leq 16$. We compare the results with the perturbative calculations in large T/T_c regions. It is found that the results from lattice calculations are consistent with perturbative ones in the region $T/T_c > 5$. In the temperature region slightly above the transition, where the perturbative calculation is not applicable, the shear viscosity is smaller than typical hadron masses. The bulk viscosity is consistent with zero in the regions, $1.4 \leq T/T_c \leq 16$.