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## **High Energy Physics – Phenomenology**

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# The SUSY Yang-Mills plasma in a T-matrix approach

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The thermodynamic properties of  $\mathcal{N} = 1$  supersymmetric Yang-Mills theory with an arbitrary gauge group are investigated. In the confined range, we show that identifying the bound state spectrum with a Hagedorn one coming from non-critical closed superstring theory leads to a prediction for the value of the deconfining temperature  $T_c$  that agrees with recent lattice data. The deconfined phase is studied by resorting to a T-matrix formulation of statistical mechanics in which the medium under study is seen as a gas of quasigluons and quasigluinos interacting nonperturbatively. Emphasis is put on the temperature range  $(1-5)\sim T_c$ , where the interaction are expected to be strong enough to generate bound states. Binary bound states of gluons and gluinos are indeed found to be bound up to 1.4  $T_c$  for any gauge group. The equation of state is then computed numerically for SU(N) and  $G_2$ , and discussed in the case of an arbitrary gauge group. It is found to be nearly independent of the gauge group and very close to that of non-supersymmetric Yang-Mills when normalized to the Stefan-Boltzmann pressure and expressed as a function of  $T/T_c$ .

Comments:The main conclusions of our previous versions are unchanged. This version is improved and is a fusion of our papers arXiv:1408.0958v2 and arXiv:1408.4979Subjects:High Energy Physics - Phenomenology (hep-ph); High Energy Physics - Lattice (hep-lat); High Energy Physics - Theory (hep-th)Journal referenceIJMPA Volume No.30, Issue No. 24 (2015)DOI:10.1142/S0217751X15501456Cite as:arXiv:1408.0958 [hep-ph](or arXiv:1408.0958v3 [hep-ph] for this version)

### Submission history

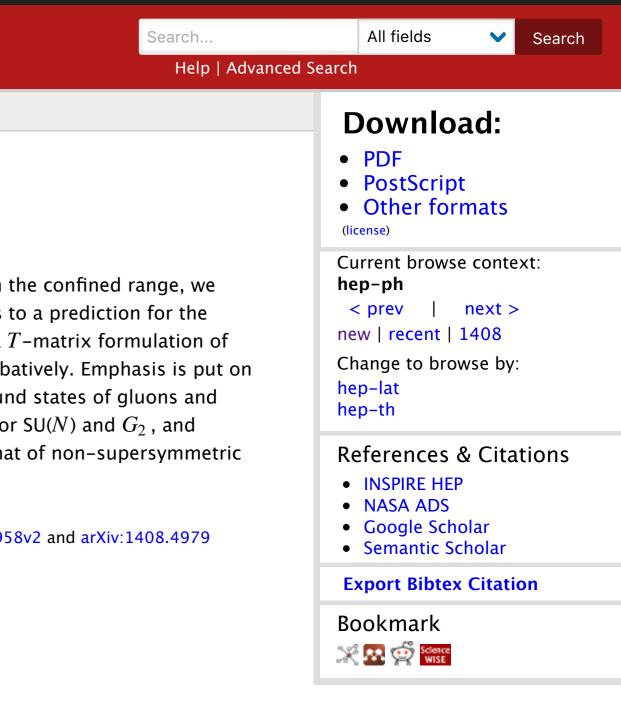
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