



SDI Review Form 1.6

Journal Name:	Physical Science International Journal
Manuscript Number:	2014_PSIJ_10296
Title of the Manuscript:	The equation of state for non-ideal quark gluon plasma
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)				
<u>Compulsory</u> REVISION comments	<p>i) The author addresses the dissociation of Quarkonium states and using the non-relativistic radial wave equation, proposes a modification of the free energy potential. The author concludes that this modification is more applicable to describe the EoS of the QGP than the conventional Mayer's cluster expansion theory.</p> <p>ii) The model considered the present work is in general consistent with whatever is available in the literature.</p> <p>iii) The manuscript suffers from numerous composition and grammatical errors and needs to be corrected.</p> <p>iv) There are several queries/suggestions which also need to be addressed before this work is published. These are</p> <p>documented in the table attached below;</p>	<p>For the line 89, and in the present work we have used $n_f m=0,2,3$ In which $n_f=0$ refers to a state of gluons , in other words a gluon plasma. While $n_f=2$ or 3 are the normal system of two quark flavours or 3 quark flavours.</p> <p>We did not use the penta quark up to $n_f=3$, we did not interest in this value during the calculations of this work and also we did not have a lattice data to compare with for such composite state.</p> <p>According to the point of line 91, we can use the critical temperature in the range $T_c(150-200)$ MeV. Then we suggested the one that gave us a good fit results with the lattice results and also because T_c in all other calculations of the potential like the bound state energy which we have got the a good satisfactory of the energies with the experimental ones.</p>				
	<table><tr><th>Line Number</th><th>Corrections/modifications/replies to be made</th></tr><tr><td>8</td><td>Replace ‘systems’ with ‘states’</td></tr></table>	Line Number	Corrections/modifications/replies to be made	8	Replace ‘systems’ with ‘states’	
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	23	Replace 'qqbar' with 'quarkonium states'	<p>According to lines 103-106 the masses calculated in the present work and we listed the references that we compared with the masses of different states in Table 2 they are refs. [22, 34, 35]</p> <p>According to lines 240-242 the $n_f=0$ is the lower curve which is dashed also like the upper one. The information from this curve that the running coupling constant behaves for gluonic plasma as well as quarks -gluon plasma. The only observation is that at $n_f=0$ is the lower values of the running.</p> <p>Line 263 α_s, m_D appear normal to me</p> <p>Figs(7,8) are clearly different, fig. (7) shows the pressure for the QGP at different n_f.</p> <p>While fig (8) shows the energy density for the QGP at different n_f. and if we like to show the discrepancies. For example Figs</p>
	30	Replace quark antiquark with 'quark/antiquark'	
	47-48	<p>"In recent years.....QCD results"</p> <p>References must be given for the works the author is mentioning</p>	
	48	<p>"Although there is no"</p> <p>The existence of QGP is now well established at LHC and RHIC in experiments such as ALICE and STAR !</p>	
	61	For the gas regime $\Gamma \leq 1$	
	62	<p>"The plasma parameter....."</p> <p>This line is a repetition and should be dropped</p>	
	66	$e\phi$ should be e_s	



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	71	Remove 'which'	<p>7, 8 at $T=T_c$ the pressure reaches to about 3 while the energy density to about 10 .</p> <p>Fig 9 shows the trace anomaly "delta " it does not match well with the lattice results , simply because the calculated pressure or energy density are not match very well with the lattice results and the trace anomaly calculated from both values.</p> <p>Line 427 Are there more such phenomenological models ? If yes, the comparative references should be quoted.</p> <p>Yes like the linear sigma model</p>
	85	A strong potential which includes a linear term such as the one in equation (4) has been extensively used for determining the coupling constant from the Charmonium decay	
	89	$n_f = 0$ will correspond to the meson (qqbar bound state). In the equation (5) $n_f = 2$ to (u,d) and similarly other values. What is the particular advantage of using $n_f = 0$? For including ccbbar and bbbbar states $n_f = 5$ should be used. It is not clear why n_f up to 3 is used.	
	91	Give justification for choosing $T_c = .2 \text{ GeV}$	
	103-106	Quote references for the values of masses used.	
	119	Mention what is r_0 ?	
	138	Details of how M_{nl} has been calculated using equation (8)	



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		numerically needs to be elaborated	
	140	Table (2) Column 4 The present work should be replaced with “ Internal Energy Potential (Present work)”	
	186	$\gamma = 0.57721\dots$ “It should be numerically represented to the decimal place up to which it has actually been computed”	
	194where ‘n’ is the density.. “mention density of what ?”	
	206	Replace Schrodinger with “Schrodinger equation”	
	240-242	Figure (2) the running coupling constant decreases i) “This is already implied in the equation (5) which is used as an input. So what new information comes from this ?” ii) In figure(2) which curve corresponds to $n_f=0$? It is not shown.	



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		iii) α should be written as α !	
	263	Fig(3) m_D should be written as m_D	
	Fig(7) and Fig(8)	Discrepancies between various calculations are quite pronounced. But the overall trends do match	
	397	It should be written that “ though Δ Tends to zero for large values of T, it still possesses a non-zero value up to $T = 3 T_c$	
	Fig 9	There is virtually no matching between the theoretical and lattice curves. An explanation for this must be included.	
	427	Are there more such phenomenological models ? If yes, the comparative references should be quoted.	



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<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		