Errata

Higher-Order Finite Temperature Effects on Effective Potentials

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The expression for the $SU(5)$ effective potential given in Sect. 3 has some serious errors. For instance, the ring diagram contribution to the effective potential, $V^{(R)}$, should be replaced by

$$V^{(R)} = 8 \left[\left(\frac{C}{9} T^2 + \frac{5}{8} \phi^2 \right)^{3/2} - \left(\frac{C}{9} \right)^{3/2} T^3 \right],$$

for $SU(4) \times U(1)$,

and

$$V^{(R)} = 12 \left[\left(\frac{C}{9} T^2 + \frac{5}{12} \phi^2 \right)^{3/2} - \left(\frac{C}{9} \right)^{3/2} T^3 \right],$$

for $SU(3) \times SU(2) \times U(1)$.

The conclusion also needs some revision. Details will be reported elsewhere.

A Finite Free Energy Density in $SU(2)$ Pure Yang-Mills Thermodynamics

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In (6) there is a prime missing in the expression $[\det(-\tilde{D}_\mu^2)_R]^{-1}$, which should indicate that the quadratic integration does only involve fluctuations $\delta A_\mu^{(n)}$ with $n \neq 0$. Consequently (6) should read correctly

$$\begin{aligned} \exp(-\Gamma[A_\mu^{(0)a}]) &= N^{(n)}(\beta) \cdot \int \prod_{\substack{a, \mu, \mathbf{x}, n \\ n \neq 0}} dA_\mu^{(n)a}(\mathbf{x}) \\ &\quad \cdot \exp[-(S^{(0,n)} + S^{(n)})] \\ &\underset{T \rightarrow \infty}{\simeq} [\det'(-\tilde{D}_\mu^2)_R]^{-1}. \end{aligned}$$

In the expression (24) the greek letter φ should be replaced by the letter ζ , i.e. the correct formula looks like

$$\mathcal{F} \underset{T \rightarrow \infty}{\simeq} -\frac{\pi^2}{15} \cdot T^4 + g^2 \cdot \frac{1}{24} \cdot T^4 + \dots$$

$$\begin{aligned} &-\frac{T}{V} \cdot \ln \left[\sum_n \sum_{\{q^{(i)} = \pm 1\}} \frac{\zeta^n}{n!} \mu^{3n} \int \prod_{i=1}^n d^3 \mathbf{x}_i \right. \\ &\quad \cdot \exp \left\{ -\frac{2\pi}{g^2 T} \cdot \sum_{i \neq j} \frac{q^{(i)} q^{(j)}}{|\mathbf{x}_i - \mathbf{x}_j|} \right\} \Big] \\ &+ \dots \end{aligned}$$

Finally the second term in (25) is wrong. Correctly expression (25) should read

$$\begin{aligned} H_I &= \frac{2\pi}{g^2} \cdot \sum_{i \neq j} \frac{q^{(i)} q^{(j)}}{|\mathbf{x}_i - \mathbf{x}_j|} \\ &\quad - \frac{2\pi}{g^2} \cdot \sum_{i \neq j} \frac{\exp(-m_E \cdot |\mathbf{x}_i - \mathbf{x}_j|)}{|\mathbf{x}_i - \mathbf{x}_j|}. \end{aligned}$$

These errors are of purely typographic origin and they do not alter any conclusions.