

Erratum to “Relativistic solutions for diatomic molecules subject to pseudoharmonic oscillator in arbitrary dimensions”

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ERRATUM

Erratum to "Relativistic solutions for diatomic molecules subject to pseudoharmonic oscillator in arbitrary dimensions"

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Klein–Gordon equation with pseudoharmonic oscillator has been corrected through physical acceptable solutions. In a way, we correct the energy spectra related to its behavior versus potential parameter D_e.

Keywords: erratum, Klein–Gordon equation, Laplace integral transform, bound states

PACS: 99.10.–x, 03.65.Ge, 03.65.Pm, 03.65.Fd **DOI:** 10.1088/1674-1056/ace356

In the article,[1] the equations and result should be given as follows:

Eq. (18):

$$\sigma = \frac{1}{2} - \frac{N}{4} \pm \sqrt{\left(\frac{1}{2} - \frac{N}{4}\right)^2 + \frac{\Lambda(\Lambda+N-2)}{4}}.$$

Eq. (20):

$$x\frac{\mathrm{d}^2 f(x)}{\mathrm{d}x^2} + \left(\frac{N}{2} + 2\sigma\right)\frac{\mathrm{d}f(x)}{\mathrm{d}x} + \frac{1}{4}(\kappa^2 - \gamma^2 x)f(x) = 0.$$

Eq. (22):

$$\left(s^2 - \frac{\gamma^2}{4}\right)\frac{\mathrm{d}F(s)}{\mathrm{d}s} = \left[\frac{\kappa^2}{4} + \left(\frac{N}{2} + 2\sigma - 2\right)s\right]F(s).$$

Eq. (23):

$$F(s) = \left(s + \frac{\gamma}{2}\right)^{-\frac{\kappa^2}{4\gamma}+\frac{N}{4}+\sigma-1}\left(s - \frac{\gamma}{2}\right)^{\frac{\kappa^2}{4\gamma}+\frac{N}{4}+\sigma-1}.$$

Eq. (25):

$$\frac{\kappa^2}{4\gamma} + \frac{N}{4} + \sigma - 1 = n, \quad n = 0, 1, 2, 3, \ldots$$

Eq. (26): we obtain the following transcendental equation:

$$\left(\frac{E_{n\ell} - \mu}{D_e} + 2\right)\sqrt{(E_{n\ell} + \mu)D_e}\, r_e = 4n + 2 + \sqrt{16\left(\frac{1}{2} - \frac{N}{4}\right)^2 + 4\left(\gamma^2 + \ell(\ell+N-2)\right)},$$

where we take the atomic units ($\hbar = 1$, $c = 1$).

We note that, in the published article,[1] Fig. 1 should be replaced by the following plots.

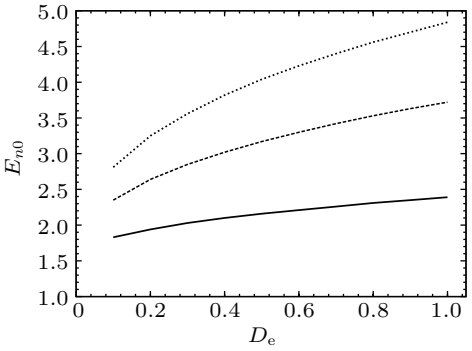


Fig. 1. In atomic units ($\hbar = 1$, $c = 1$), the relativistic 3D-vibrational energy spectrum for molecular particles. The quantum states are considered as $n = 0$, $\ell = 0$ (solid line), $n = 1$, $\ell = 0$ (dashed line), and $n = 2$, $\ell = 0$ (dotted line).

As a result of Eq. (26), particle states (without antiparticle) provide the increasing energies with decreasing parameter of spring constant energy D_e through spatial-varying mass. The other numerical-parameters are the same as those in the article.

References

[1] Ortakaya S 2013 *Chin. Phys. B* **22** 070303

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