

Erratum to:
Canonical coherent states for the relativistic harmonic oscillator, J. Math. Phys. **36**(7), 3191 (1995)

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In the mentioned paper [1] we introduced higher-order (non-polynomial), relativistic creation and annihilation operators, \hat{a}, \hat{a}^\dagger , with canonical commutation relation $[\hat{a}, \hat{a}^\dagger] = 1$ rather than the covariant one $[\hat{z}, \hat{z}^\dagger] \approx \text{energy}$ and naturally associated with the $SL(2, R)$ group. The canonical (relativistic) coherent states were then defined as eigenstates of \hat{a} . Also, a canonical, minimal representation was constructed in configuration space by means of eigenstates of a canonical position operator.

Unfortunately the expression of the operator $\hat{\kappa}$ (closely related to the energy operator) just after formula (18), then after formula (34), was miswritten. In fact, we printed the classical function of κ in terms of the functions z and z^* (see eq. (2)), whereas the correct, quantum expression is:

$$\hat{\kappa} = \frac{1}{2N} + \sqrt{\left(1 - \frac{1}{2N}\right)^2 + \frac{2}{N} \hat{z}^\dagger \hat{z}}$$

This misprint had not been detected because we always used the power series expansion (formula (17)), which features a full independence on the (energy eigenstate) basis $\{|n\rangle\}$. However, very recently, H.A. Kastrup dealing with an analogous construction [2] has detected the above-mentioned misprint [3]. We are very grateful to him for pointing it out.

References

- [1] V. Aldaya and J. Guerrero, J. Math. Phys. **36**, 3191 (1995).
- [2] H.A. Kastrup, *Quantization of the Optical Phase Space* $\mathcal{S}^2 = \{\varphi \bmod 2\pi, I > 0\}$ in Terms of the Group $SO(1, 2)$, arXiv:quant-ph/0307069.
- [3] Private communication

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