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Corrigendum

Corrigendum to "From the Weyl quantization of a particle on the circle to number–phase Wigner functions" [Ann. Physics 351 (2014) 919–934]

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The part of Section 4 which follows Eq. (4.4) i.e. 'The function $\varrho_W[\mathcal{K}_S](\Theta, n\hbar)$ given by (4.4) defines the density operator $\hat{\varrho}$ uniquely. Indeed, one can rewrite (4.4) in the following form …' till the end of Section 4 should read:

Eq. (4.4) can be rewritten in the form

$$\varrho_W[\mathcal{K}_S](\Theta, n\hbar) = \frac{1}{2\pi}\sum_{k=-\infty}^{\infty}\Big[\cos[(n-k)\Theta]\mathrm{Re}\langle k|\hat{\varrho}|n\rangle + \sin[(n-k)\Theta]\mathrm{Im}\langle k|\hat{\varrho}|n\rangle\Big]. \tag{4.5}$$

From (4.5) we easily get

$$\langle n-k|\hat{\varrho}|n\rangle + \langle n|\hat{\varrho}|n+k\rangle = 2\int_{-\pi}^{\pi}\varrho_W[\mathcal{K}_S](\Theta, n\hbar)\exp(ik\Theta)\mathrm{d}\Theta \quad \text{for } k \neq 0, \tag{4.6a}$$

$$\langle n|\hat{\varrho}|n\rangle = \int_{-\pi}^{\pi}\varrho_W[\mathcal{K}_S](\Theta, n\hbar)\mathrm{d}\Theta. \tag{4.6b}$$

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So, in general, the function $\varrho_W[\mathcal{K}_S](\Theta, n\hbar)$ does not define the state $\hat{\varrho}$ uniquely. However, if $\hat{\varrho}$ is of the form

$$\hat{\varrho} = \sum_{j,k=0}^{\infty} \varrho_{jk} |j\rangle\langle k|$$

then it is defined uniquely by the corresponding Wigner function $\varrho_W[\mathcal{K}_S](\Theta, n\hbar)$ and this is just what is needed to define the number–phase Wigner function in the next section.

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Eq. (5.32) should read:

$$\hat{f} := \frac{1}{2\pi} \sum_{n=0}^{\infty} \int_{-\pi}^{\pi} f(\phi, n) \underline{\hat{\Omega}[\mathcal{K}_s]}(\phi, n)\, \mathrm{d}\phi. \tag{5.32}$$