

**Erratum: Quantum State Smoothing for Linear Gaussian Systems
[Phys. Rev. Lett. 122, 190402 (2019)]**Kiarn T. Laverick, Areeya Chantasri[✉], and Howard M. Wiseman

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In this Letter, we conflated two different methods of semiclassical smoothing, the smoothed weak-value (SWV) state and the smoothed Wigner distribution (SWD). See Ref. [1] for a detailed explanation of their similarities and differences. All results and statements in the Letter remain valid, if the following corrigenda are made.

In the second paragraph, the sentence “Thus, we will refer to this type of smoothed state for a quantum system as the smoothed weak-value (SWV) state.” should be replaced by the sentences “A different way of doing quantum smoothing by naive generalization of the classical theory, also introduced by Tsang [4], is to treat the Wigner distribution as if it were a classical PDF, giving rise to a smoothed Wigner distribution (SWD). The ‘state’ corresponding to the SWD is also, in general, not a proper quantum state.”

Everywhere else “SWV” appears, including as a subscript, it should be replaced by “SWD.” This is also the case for Supplemental Material [2], where, in addition, the phrase “smoothed weak-valued” should be replaced by “smoothed Wigner distribution.”

Additionally, while the terminology is fairly standard throughout the field, we wish to be a bit more specific with the terminology regarding the 1SD contours in Fig. 1 and the surrounding discussion. These are strictly the $e^{-1/2}$ contours of the Wigner function which correspond only to 1SD in the principle axes of the ellipse. They are not to be confused with a contour denoting 1SD in every direction, as is the case in Ref. [3].

- [1] K. T. Laverick, A. Chantasri, and H. M. Wiseman, Inequivalent ways to apply semiclassical smoothing to a quantum system, *Phys. Rev. A* **112**, 022411 (2025).
- [2] See Supplemental Material at <http://link.aps.org/supplemental/10.1103/PhysRevLett.122.190402>.
- [3] J. Zhang and K. Mølmer, Prediction and retrodiction with continuously monitored Gaussian states, *Phys. Rev. A* **96**, 062131 (2017).