

Erratum: Quantum Advantage in Storage and Retrieval of Isometry Channels [Phys. Rev. Lett. **136**, 190601 (2026)]

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(Received 3 August 2026; published 22 September 2026)

DOI: [10.1103/34df-136k](https://doi.org/10.1103/34df-136k)

In our Letter, we reported the asymptotic expression for the optimal fidelity of isometry estimation as

$$F_{\text{est}}(n, d, D) = 1 - \frac{d(D-d)}{n} + O(n^{-2}) \quad (1)$$

in the abstract and in Eq. (4) of Theorem 1, but the subleading term $O(n^{-2})$ is incorrect. The correct expression should be

$$F_{\text{est}}(n, d, D) = 1 - \frac{d(D-d)}{n} + O(n^{-4/3}). \quad (2)$$

Accordingly, the retrieval error

$$\epsilon = 1 - F_{\text{est}}(n, d, D) = [d(D-d)]/n + O(n^{-2}) \quad (3)$$

in the last paragraph of the section “Standard quantum limit for the isometry estimation” should read

$$\epsilon = 1 - F_{\text{est}}(n, d, D) = [d(D-d)]/n + O(n^{-4/3}), \quad (4)$$

and the query complexity

$$n = [d(D-d)/\epsilon] + O(1) \quad (5)$$

in TABLE I and in the last paragraph of the section “Standard quantum limit for the isometry estimation” should read

$$n = [d(D-d)/\epsilon] + O(\epsilon^{-2/3}). \quad (6)$$

This correction does not affect the leading-order coefficient $d(D-d)$. In particular, the classical estimation strategy still requires $\Theta(\epsilon^{-1})$ queries, and the main conclusion of the Letter, namely the scaling comparison between the classical and quantum strategies for storage and retrieval of isometry channels, remains unchanged.

The error originates from the proof of Lemma S5 in Supplemental Material [1]. In Eq. (E2), the denominator in the third term of the lower bound should read

$$\frac{n}{d} - \frac{d-1}{2}g(n) + D-d \quad (7)$$

instead of

$$\frac{n}{d} + \frac{d-1}{2}g(n) + D-d. \quad (8)$$

This agrees with the derivation in Eq. (E132). With this correction, the subleading term in the lower bound contains contributions of order

$$O[g(n)^{-2}] + O[g(n)n^{-2}], \quad (9)$$

and with $g(n) = \Theta(n^{2/3})$, we obtain the correct subleading term $O(n^{-4/3})$. We have updated Supplemental Material [1] to reflect this correction and to correct minor typographical errors. We also have the following minor typographical corrections in the main text of the Letter: (i) On page 2, in the sentence beginning “It can be interpreted as ...,” “appears” should read “appears.” (ii) On page 3, in the sentence beginning “Similarly to the unitary ...,” “estimaiton” should read “estimation.” (iii) On page 7, in the footnote [50], “Intuitively, O represents a lower bound, Ω represents an upper bound, and Θ represents a tight bound.” should read “Intuitively, O represents an upper bound, Ω represents a lower bound, and Θ represents a tight bound.”

[1] See Supplemental Material at <URL>.