Correction

Correction to: How Much Delocalisation is Needed for an Enhanced Area Law of the Entanglement Entropy?

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We correct an error in the Appendix of [1]. The quantity c_v , which is defined in (A.19) in the proof of Lemma A.2, does not vanish in the limit $v \searrow 0$, contrary to the claim in (A.12). The reason is that the assumptions of Lemma A.2 allow for energies $E \in [-2, 2]$, which is a too big interval.

The problem has a simple solution which consists of restricting Lemma A.2 to energies $E \in [-v, v]$. Accordingly, the maximum over energies in the definition of c_v in (A.19) is to be taken only over the smaller interval $[-v, v]$, too, and the vanishing of c_v as $v \searrow 0$ then holds.

We point out that this change in assumptions in Lemma A.2 does not cause a problem for its applications in Lemma A.5 and in the proof of Theorem 3.4: these applications require only energies in the critical window $E \in \mathcal{W}_L := [-L^{-(\alpha+1/2)}, L^{-(\alpha+1/2)}]$ with $\alpha > 0$. Since both Lemma A.5 and Theorem 3.4 involve a minimal length scale above which their statements hold, all that needs to be done is to ensure that the minimal length scale is larger than $v^{-2/(2\alpha+1)}$ so that $\mathcal{W}_L \subset [-v, v]$, and Lemma A.2 is applicable.

Finally, and not related to the above, we remark that the right-hand side of (A.41) should not read $e^{3c_v}[-1, 1]$ but $[e^{-3c_v}, e^{3c_v}]$.

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Reference

1. Müller, P., Pastur, L., Schulte, R.: How much delocalisation is needed for an enhanced area law of the entanglement entropy? *Commun. Math. Phys.* **376**, 649–679 (2020). <https://doi.org/10.1007/s00220-019-03523-3>

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