Review of: "A Generalized Space-Efficient Algorithm for Quantum Bit String Comparators"

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Potential competing interests: No potential competing interests to declare.

String comparison is widely used in algorithms, and QBSC plays an important role in the development of quantum algorithms. In this paper, authors propose a QBSC scheme that only needs two auxiliary bits and compare the quantum cost and quantum delay of this scheme with other schemes, showing better performance. However, there are some problems. For example, how is the Z-measure gate implemented? Why does it not need to consume photons? The article needs further revision.

1. In the second paragraph of the introduction, the author introduces some problems existing in QBSC, which should add some references. And GQBSC appeared in 1.1; what is its full name, which should have been written when it first appeared.
2. The output of the CX gate in Figure 2 is somewhat confusing. I think |a>|b>\oplus |a> should be written as |b \oplus a>. The outputs of Figures 3, 4, 5, 6 are also not rigorous. And what is the V- that appears in Figure 4? And V and V+ do not appear in your circuit diagrams 12, 13. Why are they here?
3. The second part of the related work should be introduced in the introduction section, and the circuit diagrams of other researchers' work, in my opinion, do not need to be put here.
4. What is the circuit for 1BC in Figure 13? Please specify or box it in Figure 12.

5. What is the measurement used in Figures 12 and 13? Why can r0 and r1 in Figure 13 continue to participate in the circuit after measurement? Are quantum non-destructive measurements used here? If not, new auxiliary bits need to be added before the second 1BC operation, which is inconsistent with the two auxiliary bits mentioned above. If so, how does it work?

6. Whether Table 1 is correct, I calculated according to Figure 12 that when a=1 and b=0, the result is r0=1 r1=0.

7. Please check the quantum cost formula for 7 in Table 4. And what does the \Delta mean? Why is it quantum cost times instead of quantum delay times?