Modelling Time-Bin Encoding with Loops

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1 Project Overview and Goals

For this project, I would like to make a model for time-bin encoding using a loop and switch mechanism that can be reproduced in the lab.

Extra/secondary goals if time/resources allow:

- Figure out the state light is in
- Build and try the physical product
- Make a quantum gate with the product

2 Next Steps

- ☆ See what switches are being used and how they work
- ☆ Look at mesh generated by the loops and translate to math
- ☆ Look at other similar things that have been done
  - ☆ Look at simple systems first
  - ☆ Look at systems with many interferometers (still simple systems)
- ☆ See how the light time reversal thing (I forget the name) works with the loops

3 Currently Doing

- ✯ Reading Reck et al [1]
- ✯ Reading "Pulsed Energy-Time Entangled Twin-Photon Source for Quantum Communication" [2]
- ✯ Finding things that are similar

References

[1] M. Reck, A. Zeilinger, H. J. Bernstein, and P. Bertani, "Experimental realization of any discrete unitary operator," *Phys. Rev. Lett.*, vol. 73, pp. 58–61, Jul 1994.

[2] J. Brendel, N. Gisin, W. Tittel, and H. Zbinden, "Pulsed energy-time entangled twin-photon source for quantum communication," *Phys. Rev. Lett.*, vol. 82, pp. 2594–2597, Mar 1999.