

The Resurgence of the Linear Optics Interferometer — Recent Advances & Applications

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I. INTRODUCTION

Si-Hui can colour code things she adds like this
And Peter can do it like this
Let's add comments and questions like this

II. MATHEMATICAL BACKGROUND

Mathematical representation for LO networks, and very basic background on quantum optics

III. OPTICAL ENCODING OF QUANTUM INFORMATION

A. Single-photons

1. Polarisation
2. Dual-rail
3. Time-bins

B. Continuous-variables

1. Coherent states
2. Squeezed states

IV. EFFICIENT CIRCUIT DECOMPOSITIONS OF LINEAR OPTICS NETWORKS

Discuss the Reck et al. decomposition

V. EXPERIMENTAL IMPLEMENTATION

A. State preparation

1. Single-photons
2. Bell pairs
3. Coherent states
4. Squeezed states

B. Linear optics networks

1. Bulk-optics
2. Waveguides
3. Time-bins

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Discuss fibre-loop architecture

Discuss NOON states - Heisenberg limited

Discuss MORDOR scheme

C. Measurement

1. Photodetection

Discuss number-resolved and bucket detectors, multiplexed detection, APDs, current micropillar detectors

2. Homodyning

VI. APPLICATIONS FOR LINEAR OPTICS INTERFEROMETRY

A. Linear optics quantum computation

B. Boson-sampling

C. Quantum metrology

D. Encrypted quantum computation

VII. STATE OF THE ART

Discuss where experiments are at at the moment

VIII. CONCLUSION

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