CLAIMS

1. A method of detecting photons comprising:

arranging a plurality of light absorbing elements to interact with an electromagnetic standing wave at a corresponding plurality of points of the electromagnetic standing wave to absorb at least part of the electromagnetic standing wave, the plurality of light absorbing elements being spaced apart from each other;

arranging a plurality of optically transparent physical spacers, wherein a respective optically transparent physical spacer of the plurality of optically transparent physical spacers is arranged in between respective two adjacent light absorbing elements of the plurality of light absorbing elements; and

detecting, using a circuit, electrical signals generated in response to the absorption to detect photons corresponding to the electromagnetic standing wave;

wherein the circuit is configured to be electrically coupled to the plurality of light absorbing elements;

wherein arranging the plurality of light absorbing elements comprises arranging the plurality of light absorbing elements to interact with the electromagnetic standing wave at a corresponding plurality of anti-nodes of the electromagnetic standing wave;

wherein the method further comprises inducing a relative movement between the plurality of light absorbing elements and the electromagnetic standing wave to arrange the plurality of light absorbing elements to interact with the electromagnetic standing wave at a corresponding plurality of nodes of the electromagnetic standing wave; and

wherein, for each spacing between respective two adjacent light absorbing elements of the plurality of light absorbing elements, the spacing is equal to a whole number of half of a wavelength of the electromagnetic standing wave.

2. The method as claimed in claim 1, further comprising determining a quantity of the photons based on the electrical signals.

3. The method as claimed in claim 1 or claim 2, further comprising interacting two counter-propagating waves cooperatively with each other to form the electromagnetic standing wave.

4. The method as claimed in claim 3, further comprising generating the two counter-propagating waves from an electromagnetic travelling wave.

5. The method as claimed in claim 3, further comprising generating, from an electromagnetic travelling wave, a reflected propagating wave, wherein the electromagnetic travelling wave and the reflected propagating wave define the two counter-propagating waves.

6. The method as claimed in any one of claims 3 to 5,

wherein interacting the two counter-propagating waves comprises propagating the two counter-propagating waves in a waveguide structure for the two counter-propagating waves to interact cooperatively with each other in the waveguide structure to optically confine the electromagnetic standing wave in the waveguide structure, and

wherein arranging the plurality of light absorbing elements comprises arranging the plurality of light absorbing elements optically coupled to the waveguide structure.

7. The method as claimed in any one of claims 3 to 5,

wherein interacting the two counter-propagating waves comprises propagating the two counter-propagating waves through respective two optical fibers arranged spaced apart from each other for the two counter-propagating waves to interact cooperatively with each other in a spacing between the two optical fibers, and

wherein arranging the plurality of light absorbing elements comprises arranging the plurality of light absorbing elements in the spacing.

8. The method as claimed in any one of claims 1 to 7, wherein each of the plurality of light absorbing elements comprises a superconducting nanowire single-photon detector, a superconducting microwire single-photon detector, a superconducting film of a transition edge sensor, a p-n junction of a single photon avalanche diode, a photocathode of a photomultiplier tube, a gain region of a visible light photon counter, or a solid-state photomultiplier.

9. A photon detector arrangement comprising:

a plurality of light absorbing elements configured to be arranged spaced apart from each other to interact with an electromagnetic standing wave at a corresponding plurality of points of the electromagnetic standing wave to absorb at least part of the electromagnetic standing wave;

a plurality of optically transparent physical spacers, wherein a respective optically transparent physical spacer of the plurality of optically transparent physical spacers is arranged in between respective two adjacent light absorbing elements of the plurality of light absorbing elements; and

a circuit configured to be electrically coupled to the plurality of light absorbing elements, the circuit being configured to detect electrical signals generated in response to the absorption to detect photons corresponding to the electromagnetic standing wave;

wherein the plurality of light absorbing elements is arranged such that the plurality of light absorbing elements interacts with the electromagnetic standing wave at a corresponding plurality of anti-nodes of the electromagnetic standing wave;

wherein the photon detector arrangement is configured such that a relative movement between the plurality of light absorbing elements and the electromagnetic standing wave arranges the plurality of light absorbing elements to interact with the electromagnetic standing wave at a corresponding plurality of nodes of the electromagnetic standing wave; and

wherein, for each spacing between respective two adjacent light absorbing elements of the plurality of light absorbing elements, the spacing is equal to a whole number of half of a wavelength of the electromagnetic standing wave.