Claims

1. An optical beam receiver assembly comprising:

an optical filtering stack comprising a plurality of optical filter layers;

a beam shaping stack; and

a substrate having an optical receiver, the optical filtering stack and the beam shaping stack being positioned so that the optical receiver receives an optical beam that has passed through the optical filtering stack and the beam shaping stack,

wherein the optical filtering stack is configured to permit transmission of the optical beam within a wavelength range in which the optical receiver operates and attenuates other wavelengths;

wherein the optical filtering stack is further configured to reinforce the optical beam falling within the wavelength range by constructive interference in one or more of the plurality of optical filter layers;

wherein the optical filtering stack is disposed on the beam shaping stack;

wherein the optical filtering stack consists of dielectric material;

wherein the beam shaping stack comprises optical shaping elements configured to induce a phase shift to spatially shape an optical amplitude of the optical beam onto specific portions of the optical receiver; and

wherein the beam shaping stack has uniform thickness and consists of dielectric material.

2. The optical beam receiver assembly of claim 1, wherein the plurality of the optical filter layers alternate between materials of high and low refractive indices.

3. The optical beam receiver assembly of claim 1 or 2, wherein one or more of the optical filter layers have different thickness.

4. The optical beam receiver assembly of any of the claims 1 to 3, wherein adjacent optical filter layers share cladding.

5. The optical beam receiver assembly of claim 4, wherein the cladding has a different refractive index from a core of each of the adjacent optical filter layers.

6. The optical beam receiver assembly of claim 4 or 5, wherein one or more of the claddings has different thickness.

7. The optical beam receiver assembly of any one of the preceding claims, wherein the beam shaping stack comprises a plurality of beam shaping layers.

8. The optical beam receiver assembly of any one of the preceding claims, wherein the beam shaping stack comprises optical shaping elements with one or more of the following cross sections: elliptical, polygonal, or a closed Bezier curve.

9. The optical beam receiver assembly of claim 8, wherein the optical shaping elements are arranged in a lattice according to one of the following arrangements: triangular, square or hexagonal.

10. The optical beam receiver assembly of claim 8 or 9, wherein each optical shaping element dimensions depends on focus required at the optical shaping element position.

11. The optical beam receiver assembly of claim 10, wherein one or more of the optical shaping elements have different dimensions comprising one or more of height, diameter and diagonal.

12. The optical beam receiver assembly of any of the claims 7 to 11, wherein adjacent beam shaping layers share cladding.

13. The optical beam receiver assembly of claim 12, wherein the cladding has a different refractive index from a core of each of the adjacent beam shaping layers.

14. The optical beam receiver assembly of claim 12 or 13, wherein one or more of the claddings has different thickness.

15. The optical beam receiver assembly of any one of the preceding claims, wherein the optical receiver comprises one or more of: an array of free-space

photodetectors, an array of scatterers, waveguide-integrated photodetectors, an array of lenses and optoelectronic switches, and gratings.