CLAIMS

1. A system, comprising:

a lens disposed relative to a scene and configured to focus light from the scene onto a focal plane;

an aperture defined within an opaque material disposed at the focal plane of the lens, wherein the aperture has a cross-sectional area; and

an array of light detectors disposed on a side of the focal plane opposite the lens and configured to intercept and detect diverging light focused by the lens and transmitted through the aperture to the array of light detectors without reflections,

wherein the array of light detectors comprises a plurality of single photon avalanche diodes (SPADs), and

wherein a cross-sectional area of the array of light detectors that intercepts the diverging light is greater than the cross-sectional area of the aperture.

2. The system of claim 1, wherein the light detectors in the array are connected in parallel with one another.

3. The system of claim 1, wherein the cross-sectional area of the aperture is adjustable.

4. The system of claim 3, wherein the opaque material comprises an iris configured to define the cross-sectional area of the aperture.

5. The system of claim 3, wherein the opaque material comprises a patterned conductive electrode array having two polarizers; one or more alignment layers disposed between the two polarizers; and a liquid crystal layer disposed between the two polarizers.

6. The system of claim 1, wherein the light from the scene is light scattered by one or more objects being illuminated by a transmitter of a light detection and ranging (LIDAR) system.

7. The system of claim 1, further comprising a mirror configured to reflect the light from the scene transmitted through the aperture toward the array of light detectors.

8. The system of claim 1, wherein the light detectors are sensitive to light within a range of wavelengths.

9. The system of claim 1, wherein the light detectors are sensitive to light having infrared wavelengths.

10. The system of claim 1, further comprising a filter configured to divert light from the scene within one or more wavelength ranges away from the aperture so the light from the scene within the one or more wavelength ranges does not pass through the aperture.

11. The system of claim 1, wherein the opaque material comprises an opaque mask overlaying a glass substrate.

12. The system of claim 1, wherein the opaque material comprises a metal, and wherein the metal is etched to define the aperture.

13. The system of claim 1, wherein each light detector occupies a cross-sectional area of between 200 μm^2 and 600 μm^2.

14. The system of claim 1, further comprising a diffuser disposed between the array of light detectors and the aperture, wherein the diffuser is configured to diffuse the light from the scene transmitted through the aperture evenly across the array of light detectors.

15. The system of claim 1, wherein the aperture is selectable from a set of two or more apertures.

16. The system of claim 15, further comprising one or more microelectromechanical systems (MEMS) mirrors adjustable to direct the light from the scene toward the aperture to select from the set of two or more apertures.

17. The system of claim 1, wherein the aperture has a non-circular shape.

18. The system of claim 1, further comprising a structure, disposed in between the aperture and the array of light detectors, which totally internally reflects the diverging light transmitted through the aperture.

19. The system of claim 1, wherein a location of the aperture in the focal plane is adjustable.

20. The system of claim 1, wherein the aperture comprises an array of selectively switchable MEMS mirrors.

21. A method, comprising:

focusing, by a lens disposed relative to a scene, light from the scene onto a focal plane;

transmitting, through an aperture defined within an opaque material disposed at the focal plane of the lens, the light from the scene,

wherein the aperture has a cross-sectional area,

wherein the light from the scene is transmitted to an array of light detectors disposed on a side of the focal plane opposite the lens, and

wherein the light from the scene is transmitted to the array of light detectors without reflections;

diverging, by the light from the scene transmitted through the aperture;

intercepting, by the array of light detectors, the diverged light from the scene,

wherein the array of light detectors comprises a plurality of single photon avalanche diodes (SPADs), and

wherein a cross-sectional area of the array of light detectors that intercept the diverged light from the scene is greater than the cross-sectional area of the aperture; and

detecting, by the array of light detectors, the intercepted light.

22. A light detection and ranging (LIDAR) device, comprising:

a LIDAR transmitter configured to illuminate a scene with light; and

a LIDAR receiver configured to receive light scattered by one or more objects within the scene to map the scene, wherein the LIDAR receiver comprises:

a lens configured to focus the light scattered by the one or more objects within the scene onto a focal plane;

an aperture defined within an opaque material disposed at the focal plane, wherein the aperture has a cross-sectional area; and

an array of light detectors disposed on a side of the focal plane opposite the lens and configured to intercept and detect diverging light focused by the lens and transmitted through the aperture to the array of light detectors without reflections,

wherein the array of light detectors comprises a plurality of single photon avalanche diodes (SPADs), and

wherein a cross-sectional area of the array of light detectors that intercepts the diverging light is greater than the cross-sectional area of the aperture.