CLAIMS

1. An optical system comprising:

   a light source configured to generate a light beam, the light beam being coherent or partially coherent;

   a spatial light modulator configured to modulate a phase of the light beam; and

   an eyepiece for directing the modulated light beam to an eye of a viewer, the eyepiece arranged such that an optical distance between the spatial light modulator and a main plane of the eyepiece is greater than a focal length of the eyepiece;

   wherein the spatial light modulator comprises an active display area having a dimension of less than 2 mm, and

   wherein the active display area and the eye of the viewer form an object-image conjugate relationship with respect to the eyepiece.

2. The optical system according to claim 1,

   wherein the light beam is incident along a normal axis of the spatial light modulator perpendicular to the optical display area of the spatial light modulator; and

   wherein the normal axis of the spatial light modulator is not parallel to a principal axis of the eyepiece.

3. The optical system according to claim 1,

   wherein the spatial light modulator has a pixel size of less than 2 microns.

4. The optical system according to claim 1,

wherein the spatial light modulator is configured to generate a reconstructed holographic image based on a hologram loaded onto the spatial light modulator.

5. The optical system according to claim 4,

wherein a distance between the reconstructed holographic image and the eyepiece is less than the focal length of the eyepiece.

6. The optical system according to claim 1,

wherein an image of the active display area in the eye of the viewer has a dimension of less than 2 mm.

7. The optical system according to claim 1, further comprising:

a spatial filter configured to remove zero-order diffraction of the modulated light beam.

8. The optical system according to claim 1, further comprising:

an eye tracking sub-system for tracking a movement of the eye of the viewer; and

a scanning sub-system in electrical connection with the eye tracking sub-system;

wherein the scanning sub-system is configured to adjust the optical system based on the movement of the eye of the viewer.

9. The optical system according to claim 1, further comprising:

an attenuator configured to reduce an energy of the modulated light beam.

10. The optical system according to claim 1,

wherein the eyepiece comprises one or more optical see-through elements.

11. The optical system according to claim 1,

wherein the spatial light modulator comprises an array of nanoantennas.

12. The optical system according to claim 1,

wherein the spatial light modulator is a transmissive spatial light modulator.

13. The optical system according to claim 1,

wherein the spatial light modulator is a reflective spatial light modulator.

14. The optical system according to claim 1,

wherein the light source is a laser source or a light emitting diode.

15. A method of forming an optical system, the method comprising:

providing a light source configured to generate a light beam, the light beam being coherent or partially coherent;

providing a spatial light modulator configured to modulate a phase of the light beam; and

arranging an eyepiece for directing the modulated light beam to an eye of a viewer, the eyepiece arranged such that an optical distance between the spatial light modulator and a main plane of the eyepiece is greater than a focal length of the eyepiece;

wherein the spatial light modulator comprises an active display area having a dimension of less than 2 mm, and

wherein the active display area and the eye of the viewer form an object-image conjugate relationship with respect to the eyepiece.

16. The method according to claim 15,

wherein the beam is incident along a normal axis of the spatial light modulator perpendicular to the optical display area of the spatial light modulator; and

wherein the normal axis of the spatial light modulator is not parallel to a principal axis of the eyepiece.

17. The method according to claim 15,

wherein the spatial light modulator is configured to generate a reconstructed holographic image based on a hologram loaded onto the spatial light modulator.

18. The method according to claim 17,

wherein a distance between the reconstructed holographic image and the eyepiece is less than the focal length of the eyepiece.