WHAT IS CLAIMED IS:

1. A light-emitting apparatus comprising:

a light-emitting layer for emitting light; and

an optical-transformation layer coupled to the light-emitting layer, the optical-transformation layer comprising one or more optical-transformation units, each optical-transformation unit comprising a metasurface for adjusting one or more parameters of the light emitted from the light-emitting layer;

wherein the light-emitting layer comprises one or more light-emitting units;

wherein the optical-transformation units are at locations corresponding to those of the one or more light-emitting units for aligning the one or more metasurfaces with the one or more light-emitting units.

2. The light-emitting apparatus of claim 1, wherein the light-emitting layer comprises one or more Light-Emitting Diodes (LEDs) for emitting light.

3. The light-emitting apparatus of claim 1 or 2, wherein the optical-transformation layer is printed onto the light-emitting layer.

4. The light-emitting apparatus of claim 1 or 2, wherein the optical-transformation layer comprises a housing comprising one or more receptacles for receiving the one or more metasurfaces; and

wherein the one or more receptacles are at locations corresponding to those of the one or more light-emitting units for aligning the one or more metasurfaces with the one or more light-emitting units.

5. The light-emitting apparatus of claim 4, wherein each of the one or more receptacles comprises an outwardly expanding inner surface having an inner opening for receiving light emitted from the light-emitting layer and an outer opening for passing through the received light, the outer opening having an area greater than that of the inner opening.

6. The light-emitting apparatus of claim 5, wherein the inner surface of each of the one or more receptacles is reflective.

7. The light-emitting apparatus of claim 5 or 6, wherein the cross-section of the inner surface of each of the one or more receptacles has a paraboloid shape.

8. A light-emitting apparatus comprising:

a light-emitting layer for emitting light; and

an optical-transformation layer comprising one or more optical-transformation units, each optical-transformation unit comprising a metasurface, at least one metasurface being polarization-selective for selectively passing therethrough the light emitted from the light-emitting layer with a predefined polarization state;

wherein the light-emitting layer comprises one or more light-emitting units;

wherein the optical-transformation units are at locations corresponding to those of the one or more light-emitting units for aligning the one or more metasurfaces with the one or more light-emitting units.

9. The light-emitting apparatus of claim 8, wherein each of the one or more metasurfaces comprises a plurality of nano-scale structures arranged in an asymmetric base geometry.

10. The light-emitting apparatus of claim 8 or 9 further comprising:

a polarization-control layer sandwiched between the light-emitting layer and the optical-transformation layer for polarizing the light emitted from the light-emitting layer.

11. The light-emitting apparatus of claim 8 or 10, wherein the light-emitting apparatus is a grow light for facilitating the growth of one or more plants.

12. A light-emitting apparatus for facilitating the growth of one or more plants, the apparatus comprising:

a light-emitting layer for emitting light; and

at least one optical-transformation layer comprising one or more optical-transformation units, each optical-transformation unit comprising a metasurface for adjusting one or more parameters of the light emitted from the light-emitting layer for optimizing illumination configurations of the one or more plants;

wherein the light-emitting layer comprises one or more light-emitting units;

wherein the optical-transformation units are at locations corresponding to those of the one or more light-emitting units for aligning the one or more metasurfaces with the one or more light-emitting units.

13. A display apparatus comprising:

a light-emitting layer for emitting light; and

at least one optical-transformation layer comprising one or more optical-transformation units, each optical-transformation unit comprising a metasurface for adjusting one or more parameters of the light emitted from the light-emitting layer for displaying one or more images;

wherein the light-emitting layer comprises one or more light-emitting units;

wherein the optical-transformation units are at locations corresponding to those of the one or more light-emitting units for aligning the one or more metasurfaces with the one or more light-emitting units.

14. A light-emitting apparatus comprising:

a light-emitting layer for emitting light;

a polarization-control layer coupled to the light-emitting layer for polarizing the light emitted from the light-emitting layer; and

at least one optical-transformation layer coupled to the polarization-control layer, the at least one optical-transformation layer comprising one or more optical-transformation units, each optical-transformation unit comprising at least one metasurface, at least one metasurface being polarization-selective for selectively passing therethrough the polarized light from the polarization-control layer for switching between different illumination patterns or images;

wherein the light-emitting layer comprises one or more light-emitting units;

wherein the optical-transformation units are at locations corresponding to those of the one or more light-emitting units for aligning the one or more metasurfaces with the one or more light-emitting units.

15. A light-emitting apparatus comprising:

a light-emitting layer for emitting light;

a polarization-control layer coupled to the light-emitting layer for polarizing the light emitted from the light-emitting layer; and

at least one optical-transformation layer coupled to the polarization-control layer, the at least one optical-transformation layer comprising one or more optical-transformation units, each optical-transformation unit comprising at least one metasurface, at least one metasurface being polarization-selective for selectively passing therethrough the polarized light from the polarization-control layer for creating multiple different illumination patterns or images at different locations;

wherein the light-emitting layer comprises one or more light-emitting units;

wherein the optical-transformation units are at locations corresponding to those of the one or more light-emitting units for aligning the one or more metasurfaces with the one or more light-emitting units.

16. A light-emitting apparatus comprising:

a light-emitting layer for emitting light towards a source field of view (FOV); and

at least one metasurface layer in front of the light-emitting layer for directing the light emitted from the light-emitting layer towards a first FOV having an angular span smaller than that of the source FOV.

17. The light-emitting apparatus of claim 16 further comprising:

a polarization-control layer sandwiched between the light-emitting layer and the at least one optical-transformation layer;

wherein the polarization-control layer is configured for, in response to a control signal, polarizing the light emitted from the light-emitting layer to a first polarization state or to a second polarization state; and

wherein the at least one optical-transformation layer is configured for directing the light from the polarization-control layer in the first polarization state towards a first FOV having an angular span smaller than that of the source FOV, and directing the light from the polarization-control layer in the second polarization state towards a second FOV having an angular span greater than that of the first FOV.

18. A light-emitting apparatus comprising:

a light-emitting layer for emitting light; and

an optical-transformation layer in front of the light-emitting layer, the optical-transformation layer comprising a plurality of optical-transformation units, each optical-transformation unit comprising a metasurface for directing light emitted from the light-emitting layer towards a target area for forming a predefined light-distribution pattern;

wherein the light-emitting layer comprises one or more light-emitting units;

wherein the optical-transformation units are at locations corresponding to those of the one or more light-emitting units for aligning the one or more metasurfaces with the one or more light-emitting units.

19. The light-emitting apparatus of claim 18, wherein the predefined light-distribution pattern is a substantively uniform optical-energy distribution on the target area.

20. The light-emitting apparatus of claim 19, wherein the plurality of metasurfaces comprise a first set of metasurfaces for directing the light emitted from the light-emitting layer towards borders of the target area, and a second set of metasurfaces for directing the light emitted from the light-emitting layer towards a center of the target area, for generating the substantively uniform optical-energy distribution on the target area.

21. A solar-energy harvesting apparatus comprising:

a photovoltaic layer having a plurality of photovoltaic cells; and

at least one metasurface layer in front of the photovoltaic layer for directing light to the photovoltaic layer substantively without causing reflection on the photovoltaic layer.

22. The solar-energy harvesting apparatus of claim 21 comprising a plurality of metasurface layers for directing light at an incident angle within a predefined range to perpendicularly imping the photovoltaic layer.

23. A light-emitting apparatus comprising:

a light-emitting layer for emitting light; and

at least one metasurface layer in front of the light-emitting layer for directing the light emitted from the light-emitting layer in a first polarization state towards a first FOV and directing the light emitted from the light-emitting layer in a second polarization state towards a second FOV;

wherein the first and second FOVs are overlapped and laterally offset from each other for forming a three-dimensional (3D) perception to a user wearing a pair of glasses with lenses of different polarization states.

24. A light-emitting apparatus comprising:

a light-emitting layer for emitting light; and

at least one metasurface layer in front of the light-emitting layer for directing the light emitted from the light-emitting layer in a first polarization state towards a first FOV and directing the light emitted from the light-emitting layer in a second polarization state towards a second FOV;

wherein the first and second FOVs are laterally offset from each other such that the first FOV is only viewable to a first eye of a user at a predefined distance and the second FOV is only viewable to a second eye of the user at the predefined distance, for forming a 3D perception to the user.