WHAT IS CLAIMED IS:

1. An optical display system, comprising:

a light source;

a control unit, and

an array of at least two pixels, each of the pixels is a juxtaposed double grating element, comprising a first grating and a second grating spaced apart at a constant distance from each other, each of the two gratings having at least two edges, at least one sequence of a plurality of lines and an aperture;

the spacing between the lines gradually changes over the aperture of the gratings;

the first grating diffracts a light wave from the light source towards the second grating and the light wave is further diffracted by the second grating as an output light wave in a given direction,

wherein for each of the pixels the direction of the output light wave from the second grating is separately, dynamically and externally controlled by the control unit.

2. The optical display system according to claim 1, wherein the pixels further comprising a light transmitting substrate having at least two major surfaces located between the first and the second gratings, wherein the refractive index of the light transmitting substrate is externally controlled and the direction of the output light wave from the second grating is controlled by changing the refractive index of the substrate.

3. The optical display system according to claim 1, wherein for each pixel at least one of the two gratings is laterally displaceable and the direction of the output light wave from the second grating is controlled by a lateral displacement of one of the gratings with respect to the other.

4. The optical display system according to claim 1, wherein the pixels further comprise a third grating, located in front of the first grating, having at least one major

axis, wherein the third grating is rotatable about a major axis and the direction of the output beam from the second grating is controlled by a rotation of the third grating.

5. The optical display system according to claim 1, wherein each of the pixels further comprising additional third and fourth gratings, each having at least two edges, located at a constant distance from each other, each of the two additional gratings comprising at least one sequence of a plurality of lines, wherein the spacing between the lines gradually changes over the aperture of the grating, and wherein said third grating is diffracting the output light wave from the second grating into the forth grating and the light wave being diffracted by said fourth grating as an output light wave from the pixel in a given direction, wherein for each pixel the direction of the output light wave from the second grating is deviated along a first axis, and the direction of the output light wave from the fourth grating is separately, dynamically and externally controlled by the control unit, and is deviated along a second axis, different than the first axis.

6. The optical display system according to claim 1, wherein the sequence of the plurality of lines of at least one of the gratings has a radial symmetry, for each pixel at least one of the two gratings is laterally displaceable, the direction of the output light wave from the second grating is controlled by a lateral displacement of one of the gratings with respect to the other, and the direction of the output light wave from the second grating can be deviated along two different axes.

7. The optical display system according to claim 1, wherein at least one of the gratings is multiplexed of three different gratings sensitive to three different colors, respectively, and each of the gratings is not sensitive to the other two colors.

8. The optical display system according to claim 7, wherein the first grating is multiplexed of three different gratings sensitive to three different colors respectively, and the second grating comprising three different laterally displaced gratings is sensitive to the same three different colors, respectively.

9. The optical display system according to claim 7, wherein the pixels further comprising three different color filters, each one of the filters is transparent to one of said three different colors and substantially non-transparent to the other two colors.

10. The optical display system according to claim 1, further comprising an exit pupil wherein the output light waves from the pixels can be deviated by the control system into the exit pupil or outside of the exit pupil.

11. The optical display system according to claim 1, wherein the optical display system projects a stereoscopic dynamic image into eyes of a viewer.

12. The optical display system according to claim 1, wherein the optical display system projects at least two different images into different viewing angles.

13. The optical display system according to claim 1, further comprising an eyeball tracking unit for detecting position or gazing points of a viewer's eye and a processing unit for processing data collected by the eyeball tracking unit and for transferring the data to the control unit.

14. The optical display system according to claim 13, wherein the direction of the output light waves from the pixels or the context of a projected scene is set by a position or the gazing point of the viewer’s eye, and the output light waves from the pixels are directed into the viewer’s eyes.

15. The optical display system according to claim 14, wherein different images are projected into the two eyes of the viewer.

16. The optical display system according to claim 14, wherein the divergence of the output light waves is set to cover an eye-motion box of the viewer.

17. The optical display system according to claim 13, wherein the system stops projecting an image when the gazing point of the viewer is not directed to the display.

18. The optical display system according to claim 13, wherein the eyeball tracking unit tracks the position or the gazing point of more than one viewer, and scenes from the display are simultaneously projected to different viewers.

19. The optical display system according to claim 1, wherein the pixels comprise Fresnel elements.

20. The optical display system according to claim 1, wherein the light source is a white light source.