CLAIMS

1. A light valve for guiding light, comprising:

a first end at which light may enter the light valve and propagate in a first direction;

a second end comprising a reflective surface arranged to redirect light propagating in said first direction to propagate in a second direction back toward the first end, wherein the second end is a curved reflective surface, or a Fresnel equivalent of a curved reflective surface;

a first light guiding surface extending between the first and second ends, wherein the first light guiding surface is planar; and

a second light guiding surface, extending between the first and second ends opposite the first light guiding surface, further comprising a plurality of guiding features and a plurality of extraction features that are curved along the direction in which they are elongated, wherein the extraction features and the guiding features are connected to and alternate with one another respectively, further wherein the plurality of extraction features allow light to pass with low loss when the light is propagating in a first direction and allow light to reflect and exit the light valve when the light is propagating in a second direction,

wherein a degree of curvature of the extraction features along the direction in which the extraction features are elongated causes the light from a plurality of illumination elements to be focused, whereby the extraction features and the curvature of the second end cooperate to direct focused light into respective viewing windows.

2. The light valve for guiding light of claim 1, wherein the first end is thinner than the second end.

3. The light valve for guiding light of claim 1, wherein the extraction features are optically hidden from light propagating in a first direction.

4. The light valve for guiding light of claim 1, further comprising illumination elements for generating light to enter at the first end of the light valve, wherein the illumination elements are LEDs.

5. The light valve for guiding light of claim 1, further comprising illumination elements for generating light to enter at the first end of the light valve, wherein the illumination elements are an array of illumination elements configured to provide light at the first end of the light valve.

6. The light valve for guiding light of claim 1, wherein each of the plurality of extraction features are elongated, linear surfaces.

7. The light valve for guiding light of claim 1, wherein each of the plurality of extraction features are planar.

8. The light valve for guiding light of claim 1, wherein each of the plurality of extraction features are parallel to one another.

9. The light valve for guiding light of claim 1, wherein each of the plurality of extraction features are separated by the same distance.

10. The light valve for guiding light of claim 1, wherein the plurality of extraction features have a tilt angle between 20 and 50 degrees.

11. The light valve for guiding light of claim 1, wherein the guiding features are planar.

12. The light valve for guiding light of claim 1, wherein the guiding features are parallel to the first light guiding surface.

13. The light valve for guiding light of claim 1, wherein the guiding features have a wedge angle compared to the first light guiding surface.

14. The light valve for guiding light of claim 1, wherein the second end is a concave mirror.

15. The light valve for guiding light of claim 1, wherein the second end is coated with a reflective coating.

16. The light valve for guiding light of claim 1, wherein the second end is a cylindrical mirror.

17. The light valve for guiding light of claim 16, wherein the optical axis of the cylindrical mirror is orthogonal to the surface normal of the first light guiding surface.

18. The light valve for guiding light of claim 1, wherein each extraction feature has a surface normal direction to direct at least some of the light propagating in the second direction to be extracted in a direction outside the light valve.

19. The light valve for guiding light of claim 1, wherein the extracted light passes from the extraction feature, and exits from the light valve through the first light guiding surface.

20. The light valve for guiding light of claim 1, further comprising illumination elements for generating light to enter at the first end of the light valve, wherein the second light guiding

surface is configured so that light from the illumination elements are incident on the light extracting features after reflecting from the second end.

21. The light valve for guiding light of claim 1, wherein the plurality of extraction features further comprise:

a first region wherein the extraction features of the first region have a first orientation; and

a second region wherein the extraction features of the second region have a second orientation, wherein the first orientation and the second orientations are different from one another.

22. The light valve for guiding light of claim 1, wherein the first light guiding surface and the second light guiding surface are transparent.

23. The light valve for guiding light of claim 1, wherein the orientation of the extraction features varies across the light valve from the first end to the second end.

24. The light valve for guiding light of claim 1, further comprising a vertical diffuser, wherein the vertical diffuser further comprises an asymmetric scattering surface.

25. The light valve for guiding light of claim 1, wherein light extraction is achieved by refraction at the extraction features of the light valve.