optics preserve at an image plane an angle of emergence with respect to an object plane.

2. The apparatus of claim 1, wherein the first axis is substantially perpendicular to the second axis.

3. The apparatus of claim 1 wherein the mirrors in the first array are configured to deflect light from one or more optical fibers in an N×N array of input fibers.

4. The apparatus of claim 1 wherein the mirrors in the first and second arrays are microelectromechanical MEMS) mirrors.

5. The apparatus of claim 1 wherein an angle of a mirror in the first array and an angle of a mirror in the second array determines a position and angle of the light beam at the image plane.

6. The apparatus of claim 1 wherein the relay optics comprises:

i) a first focusing element having a first focal length;

ii) a second focusing element having a second focal length.

7. The apparatus of claim 6 wherein the first and second focal lengths are substantially the same.

8. The apparatus of claim 7 wherein the first and second focusing elements are separated from each other by a distance of twice their common focal length.

9. The apparatus of claim 7 wherein the first focusing element is separated from the first mirror array by a distance substantially equal to the first focal length.

10. The apparatus of claim 7 wherein the second focusing element is separated from the second mirror array by a distance substantially equal to the second focal length.

11. A beam steering apparatus comprising:

a) a first beam steering module; and

b) a second beam steering module optically coupled to the first beam steering module;

wherein each of the first and second beam steering modules includes:

i) a first N×M array of mirrors, wherein N and M are integers and each mirror in the first array is configured to rotate about a single first axis;

ii) a second N×M array of mirrors, wherein each mirror in the second array is configured to rotate about a single second axis;

iii) relay optics disposed along an optical path between the first and second arrays configured to image a light beam emerging from a mirror in the first array onto a corresponding mirror in the second array, wherein the relay optics preserve at an image plane an angle of emergence with respect to an object plane.

12. The apparatus of claim 11, wherein the first and second modules are configured to control, at a plane of an output fiber grid, a position and angle of a light beam emerging from any input fiber in an N×M array.

13. The apparatus of claim 11 wherein an angle of a mirror in the first array and an angle of a mirror in the second array determines a position and an angle of the light beam at the image plane.

14. The apparatus of claim 11 wherein the first and second beam steering modules are configured to direct a beam from an input fiber in an N×M input fiber array to an output fiber in an N×M output fiber array.

15. The apparatus of claim 11 wherein at least one of the input and output fiber arrays is an array of collimated fibers.

16. The apparatus of claim 11 wherein the mirrors in the first and second modules are microelectromechanical (MEMS) mirrors.

17. A beam steering method, comprising:

a) coupling a beam of light to a first mirror in a first N×M array of mirrors, wherein N and M are integers and each mirror in the first array is configured to rotate about a first axis;

b) deflecting the beam from the first mirror to a second mirror in a second N×M array of mirrors, wherein each mirror in the second array is configured to rotate about a second axis;

c) imaging the light beam emerging from the first mirror at the second mirror, while preserving at an image plane an angle of emergence with respect to an object plane.

18. The method of claim 17 further comprising:

d) deflecting the beam from the second mirror to a third mirror in a third N×M array of mirrors, wherein each mirror in the third array is configured to rotate about a third axis substantially parallel to the second axis;

e) deflecting the beam from the third mirror to a fourth mirror in a fourth N×M array of mirrors, wherein each mirror in the fourth array is configured to rotate about a fourth axis substantially perpendicular to the third axis; and

f) imaging the light beam emerging from the third mirror at the fourth mirror, wherein an angle of the beam with respect to an image plane is related to an angle of the beam with repsect to an object plane by a predetermined relationship.

19. The method of claim 17 further comprising deflecting the light beam from the fourth mirror to a selected output fiber in an N×M array of output fibers.

20. The method of claim 19 wherein angular positions of the first and second mirrors determines which fiber in the output fiber array is the selected.

21. The method of claim 17 wherein the object plane is located proximate the first array.

22. The method of claim 17 wherein the image plane is located proximate the second array.

23. The method of claim 17 wherein the beam of light originates at an input fiber in an N×M input fiber array.

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