What is claimed is:

1. An apparatus for improving energy uniformity of coherent light, comprising:

a plurality of lenses positioned to produce a composite projection field; and

a refractive medium having one or more first surfaces and a plurality of second surfaces, wherein each second surface is located at a plurality of distances from the one or more first surfaces, and the refractive medium is positioned to receive the composite projection field at the one or more first surfaces and to transmit an energy field from the plurality of second surfaces, or the refractive medium is positioned to receive the composite projection field at the plurality of second surfaces and to transmit the energy field from the one or more first surfaces.

2. The apparatus of claim 1, wherein the plurality of lenses is a microlens array.

3. The apparatus of claim 1, wherein the refractive medium is a prism.

4. The apparatus of claim 1, wherein the refractive medium is a plurality of plates.

5. The apparatus of claim 1, wherein the refractive medium is a plurality of rods.

6. The apparatus of claim 2, wherein the refractive medium is a prism.

7. The apparatus of claim 3, wherein the prism comprises a plurality of columns having a plurality of different lengths.

8. The apparatus of claim 4, wherein each plate has a thickness greater than a coherence length of the coherent light.

9. The apparatus of claim 5, wherein no two rods have the same length.

10. The apparatus of claim 1, wherein surfaces of the refractive medium other than the one or more first surfaces and the plurality of second surfaces are coated with a reflective material.

11. The apparatus of claim 1, wherein each surface of the refractive medium transmitting the energy field is diffusive.

12. An apparatus for generating a uniform illumination field, comprising:

a laser projecting radiation along an optical path;

a plurality of lenses disposed along a plane perpendicular to the optical path;

a refractive optic disposed along the optical path, the refractive optic having a first surface intersecting the optical path and a second surface intersecting the optical path, wherein the first surface defines a plane perpendicular to the optical path, and the second surface comprises a plurality of facets, each facet defining a plane perpendicular to the optical path, and wherein no two facets are the same distance from the first surface, the plurality of lenses being disposed between the laser and the refractive optic.

13. The apparatus of claim 12, wherein a distance of each facet from the first surface is different from the distance of every other facet from the first surface by an amount greater than a coherence length of the laser.

14. The apparatus of claim 12, wherein a distance between the plurality of lenses and the refractive optic is greater than a focal length of any of the plurality of lenses.

15. The apparatus of claim 12, further comprising a second laser and a beam combiner between the lasers and the plurality of lenses.

16. The apparatus of claim 12, further comprising a pulse shaper disposed to receive radiation transmitted by the refractive optic.

17. The apparatus of claim 12, wherein the refractive optic comprises a plurality of etalons.

18. The apparatus of claim 12, further comprising a work surface for receiving a workpiece to be processed by radiation from the laser, the work surface disposed substantially perpendicular to the optical path of the laser.

19. An apparatus for improving energy uniformity of coherent light, comprising:

a plurality of lenses positioned to produce a composite projection field; and

a refractive medium having a plurality of transit paths for the coherent light, the transit paths having a plurality of transit times through the refractive medium.

20. The apparatus of claim 19, wherein the transit paths comprise a plurality of materials having different refractive indices.

21. The apparatus of claim 19, wherein the transit paths comprise a plurality of different distances.

What is claimed is:

1. An apparatus for improving energy uniformity of coherent light, comprising:

a plurality of lenses positioned to produce a composite projection field; and

a refractive medium having one or more first surfaces and one or more second surfaces, wherein each second surface is located at one or more distances from the one or more first surfaces, and the refractive medium is positioned to receive the composite projection field at the one or more first surfaces and to transmit an energy field from the one or more second surfaces, or the refractive medium is positioned to receive the composite projection field at the one or more second surfaces and to transmit the energy field from the one or more first surfaces, wherein the refractive medium is a plurality of plates.

2. The apparatus of claim **1**, wherein each plate has a thickness greater than a coherence length of the coherent light.

3. The apparatus of claim **1**, wherein the plurality of lenses is a microlens array.

4. The apparatus of claim **1**, wherein surfaces of the refractive medium other than the one or more first surfaces and the one or more second surfaces are coated with a reflective material.

5. The apparatus of claim **1**, wherein each surface of the refractive medium transmitting the energy field is diffusive.

6. The apparatus of claim **1**, wherein a distance between the plurality of lenses and the refractive medium is greater than a focal length of any of the plurality of lenses.

7. An apparatus for improving energy uniformity of coherent light, comprising:

a plurality of lenses positioned to produce a composite projection field; and

a refractive medium having one or more first surfaces and one or more second surfaces, wherein each second surface is located at one or more distances from the one or more first surfaces, and the refractive medium is positioned to receive the composite projection field at the one or more first surfaces and to transmit an energy field from the one or more second surfaces, or the refractive medium is positioned to receive the composite projection field at the one or more second surfaces and to transmit the energy field from the one or more first surfaces, wherein the refractive medium is a plurality of rods.

8. The apparatus of claim **7**, wherein no two rods have the same length.

9. The apparatus of claim **7**, wherein the plurality of lenses is a microlens array.

10. The apparatus of claim **7**, wherein surfaces of the refractive medium other than the one or more first surfaces and the one or more second surfaces are coated with a reflective material.

11. The apparatus of claim **7**, wherein each surface of the refractive medium transmitting the energy field is diffusive.

12. The apparatus of claim **7**, wherein a distance between the plurality of lenses and the refractive medium is greater than a focal length of any of the plurality of lenses.