CLAIMS

1. An imaging system, comprising:

a metalens array, comprising:

first metalens elements disposed on a first substrate, wherein:

the first metalens elements are spaced from each other; and

each of the first metalens elements has a first width from a first leading sidewall to a first trailing sidewall; and

second metalens elements disposed on a second substrate and contacting a lower surface of the first substrate and an upper surface of the second substrate, wherein:

the second metalens elements are spaced from each other;

each of the second metalens elements has a second width from a second leading sidewall to a second trailing sidewall;

the second trailing sidewall extends past the first trailing sidewall of each of the first metalens elements disposed on the first substrate; and

the second leading sidewall of each of the second metalens elements extends past the first leading sidewall of each of the first metalens elements disposed on the first substrate,

wherein the metalens array is configured such that a first beam of light incident on the metalens array is reflected and collimated into a reflected beam, and

wherein the metalens array is at least partially transparent to visible light in a direction parallel to the direction of the reflected beam.

2. The imaging system of claim 1, wherein at least one of the first substrate and the second substrate comprises glass.

3. The imaging system of claim 1, wherein at least one of the first substrate and the second substrate comprises plastic.

4. The imaging system of claim 1, wherein the imaging system is an augmented reality (AR) imaging system.

5. The imaging system of claim 1, further comprising a micro display, wherein light created from the micro display forms the first beam of light.

6. The imaging system of claim 5, wherein the reflected beam creates a virtual image of an object on the micro display with respect to an observer positioned upstream from the reflected beam.

7. The imaging system of claim 1, further comprising:

third metalens elements disposed on a third substrate and contacting the lower surface of the second substrate and the upper surface of the third substrate, wherein:

the third metalens elements are spaced from each other;

each of the third metalens elements has a third width from a third leading sidewall to a third trailing sidewall;

the third trailing sidewall of each of the third metalens elements extends past the second trailing sidewall of each of the second metalens elements disposed on the second substrate; and

the third leading sidewall of each of the third metalens elements extends past the second leading sidewall of each of the second metalens elements disposed on the second substrate.

8. An imaging system, comprising:

a frame;

a lens attached to the frame; and

a metalens array disposed in the lens, the metalens array comprising:

first metalens elements disposed on a first substrate, wherein:

the first metalens elements are spaced from each other; and

each of the first metalens elements has a first width from a first leading sidewall to a first trailing sidewall; and

second metalens elements disposed on a second substrate and contacting a lower surface of the first substrate and an upper surface of the second substrate, wherein:

the second metalens elements are spaced from each other;

each of the second metalens elements has a second width from a second leading sidewall to a second trailing sidewall;

the second trailing sidewall extends past the first trailing sidewall of each of the first metalens elements disposed on the first substrate; and

the second leading sidewall of each of the second metalens elements extends past the first leading sidewall of each of the first metalens elements disposed on the first substrate,

wherein the metalens array is configured such that a first beam of light incident on the metalens array is reflected and collimated into a reflected beam, and

wherein the metalens array is at least partially transparent to visible light in a direction parallel to the direction of the reflected beam.

9. The imaging system of claim 8, wherein at least one of the first substrate and the second substrate comprises glass.

10. The imaging system of claim 8, wherein at least one of the first substrate and the second substrate comprises plastic.

11. The imaging system of claim 8, wherein the imaging system is an augmented reality (AR) imaging system.

12. The imaging system of claim 8, further comprising a micro display, wherein light created from the micro display forms the first beam of light.

13. The imaging system of claim 12,

wherein the reflected beam creates a virtual image of an object on the micro display with respect to an observer positioned upstream from the reflected beam; and

wherein the imaging system is configured to be worn by the observer.

14. The imaging system of claim 8, further comprising:

third metalens elements disposed on a third substrate and contacting the lower surface of the second substrate and the upper surface of the third substrate, wherein:

the third metalens elements are spaced from each other;

each of the third metalens elements has a third width from a third leading sidewall to a third trailing sidewall;

the third trailing sidewall of each of the third metalens elements extends past the second trailing sidewall of each of the second metalens elements disposed on the second substrate; and

the third leading sidewall of each of the third metalens elements extends past the second leading sidewall of each of the second metalens elements disposed on the second substrate.