CLAIMS

What is claimed is:

1. An apparatus comprising:

a first photon emitter array comprising a first plurality of photon emitters configured to emit coherent and polarized photons oriented at a first polarization orientation onto a location of a surface of an article;

a second photon emitter array comprising a second plurality of photon emitters configured to emit coherent and polarized photons oriented at a second polarization orientation onto the surface of the article, wherein the second plurality of photon emitters emit onto the same location of the surface as the first plurality of photon emitters;

a photon detector configured to receive photons scattered from features on the surface of the article; and

a mapping means for mapping the features on the surface of the article based on information received from the photon detector ~~array~~.

2. The apparatus of Claim 1, wherein:

one photon emitter of the plurality of photon emitters is configured to emit photons of a first wavelength and another photon emitter of the plurality of photon emitters is configured to emit photons of a second wavelength; and

the first and second wavelengths are different.

3. The apparatus of Claim 1, wherein the first plurality of photon emitters is configured to selectively change the emitted photons from one polarization orientation to another polarization orientation.

4. The apparatus of Claim 1, wherein at least one of the photon emitters is a solid state diode.

5. The apparatus of Claim 1, wherein one photon emitter of the plurality of photon emitters is arranged in parallel with respect to another photon emitter of the plurality of photon emitters.

6. The apparatus of Claim 1 further comprising a telecentric lens coupled to the photon detector.

7. The apparatus of Claim 1, wherein the photon detector comprises a complementary metal-oxide semiconductor ("CMOS"), a scientific complementary metal-oxide semiconductor ("sCMOS"), or a charge-coupled device ("CCD").

8. An apparatus comprising:

a photon emitter array comprising a plurality of photon emitters selectively oriented in a plurality of polarized orientations and configured to controllably emit photons onto a surface of an article;

a photon detector configured to receive photons scattered from features on the surface of the article, wherein the photon detector is further configured to simultaneously receive photons oriented in the plurality of polarized orientations; and

a mapping means for mapping the features on the surface of the article based on information received from the photon detector ~~array~~.

9. The apparatus of Claim 8, wherein the plurality of photon emitters is configured to selectively change the emitted photons from one orientation to another orientation of the plurality of polarized orientations.

10. The apparatus of Claim 8, wherein:

one photon emitter of the plurality of photon emitters is configured to emit photons of a first wavelength and another photon emitter of the plurality of photon emitters is configured to emit photons of a second wavelength; and

the first and second wavelengths are different.

11. The apparatus of Claim 8, wherein the plurality of photon emitters is configured to emit photons simultaneously.

12. The apparatus of Claim 8, wherein the plurality of photon emitters is configured to emit photons asynchronously based on a photon emitter characteristic.

13. The apparatus of Claim 12, wherein the photon emitter characteristic includes a polarization orientation of a photon emitter of the plurality of photon emitters, photon wavelength emitted by the photon emitter, or a combination of the polarization orientation and the photon wavelength.

14. An apparatus comprising:

at least two photon emitters, each with a different preselected polarization orientation, and configured to simultaneously emit polarized photons onto a location of a surface of an article; and

a processing means configured to:

process photon-detector signals corresponding to photons scattered from surface features of the article, and

generate one or more surface features maps for the article from the photon-detector signals corresponding to the photons scattered from the surface features of the article.

15. The apparatus of Claim 14, wherein the photon emitters are configured to selectively change the emitted photons from one polarization orientation to another polarization orientation.

16. The apparatus of Claim 14, wherein:

one photon emitter of the at least two photon emitters is configured to emit photons of a first wavelength and another photon emitter of the at least two photon emitters is configured to emit photons of a second wavelength; and

the first and second wavelengths are different.

17. The apparatus of Claim 14, wherein:

~~the at least two~~another photon emitter is~~s~~ ~~are~~ configured to emit photons asynchronously based on a photon emitter characteristic; and

the photon emitter characteristic includes a polarization orientation of a photon emitter of the at least two photon emitters, photon wavelength emitted by the photon emitter, or a combination of the polarization orientation and the photon wavelength.

18. The apparatus of Claim 14 further comprising a photon emitter array comprising a plurality of photon emitters, wherein the plurality of photon emitters includes the at least two photon emitters.

19. The apparatus of Claim 14 further comprising a photon detector configured to receive photons scattered from features on the surface of the article and transmit photon-detector signals to the processing means.

20. The apparatus of Claim 19, wherein the photon detector comprises a complementary metal-oxide semiconductor ("CMOS"), a scientific complementary metal-oxide semiconductor ("sCMOS"), or a charge-coupled device ("CCD").