CLAIMS

What is claimed is:

1. An apparatus, comprising:

a photon emitter configured to emit photons onto a surface of an article in a ~~first~~ photon pulse,

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

a processing means configured for:

processing photon-detector-array signals corresponding to the scattered photons and fluoresced photons received by the photon detector array during the ~~first~~ photon pulse and subsequent to the ~~first~~ photon pulse, respectively, and

~~wherein the processing means is further configured for~~ classifying the surface features ~~of the article~~ from the photon-detector-array signals corresponding to the scattered photons and the fluoresced photons.

2. The apparatus of Claim 1, further comprising a telecentric lens, wherein the telecentric lens is coupled to the photon detector array.

3. The apparatus of Claim 1, wherein classifying the surface features comprises classifying the surface features as inorganic or organic by contrasting photon-detector-array signals corresponding to the scattered photons and the fluoresced photons ~~photons scattered from the surface features and photons fluoresced from the surface features~~.

4. The apparatus of any one of Claims 1-3, wherein the processing means is further configured for producing:

a map of the surface features from the scattered photons ~~scattered from the surface features during the first photon pulse~~.

5. The apparatus of any one of Claims 1-3, wherein the processing means is further configured for producing one or more maps of the surface features from the fluoresced photons ~~fluoresced from the surface features subsequent to the first photon pulse~~.

6. The apparatus of any one of Claims 1-3, wherein the processing means is further configured for producing

a map of the surface features from the scattered photons; ~~scattered from the surface features during the first photon pulse~~ and

one or more additional maps of the surface features from the fluoresced photons ~~fluoresced from the surface features subsequent to the first photon pulse~~,

wherein the one or more additional maps of the surface features from the fluoresced photons ~~fluoresced from the surface features p~~provides classifying information~~, optionally~~ by contrast with the map of the surface features from the scattered photons ~~scattered from the surface features~~.

7. The apparatus of Claim 1, further comprising one or more additional photon emitters configured to emit photons onto the surface of the article.

8. The apparatus of any one of Claims 1-3 and 7, wherein the processing means is further configured for processing photon-detector-array signals corresponding to photons received by the photon detector array during one or more additional pulses of photons subsequent to the ~~first~~ photon pulse and in-between the one or more additional pulses of photons subsequent to the ~~first~~ photon pulse.

9. The apparatus of any one of Claims 1-3 and 7, wherein the processing means comprises one or more computers or equivalent devices, operable to classify the surface features from the photon-detector-array signals.

10. An apparatus, comprising:

a photon emitter configured for emitting photons onto a surface of an article ~~in a first photon pulse~~,

a photon detector array coupled to a telecentric lens, configured for receiving both scattered photons and fluoresced photons from surface features of the article,

wherein the photon emitter and the photon detector array are synchronized with respect to emitting photons and receiving photons; and

a processing means configured for:

processing photon-detector-array signals corresponding to the scattered photons and the fluoresced photons received by the photon detector array during one or more pulses of photons and in-between the one or more pulses of photons, respectively, and

~~wherein the processing means is further configured for~~ classifying the surface features ~~of the article~~ from the photon-detector-array signals corresponding to the scattered photons and the fluoresced photons.

11. The apparatus of Claim 10, wherein classifying the surface features comprises classifying the surface features as inorganic or organic by contrasting photon-detector-array signals corresponding to the scattered photons ~~scattered from the surface features~~ and the fluoresced photons ~~fluoresced from the surface features~~.

12. The apparatus of Claim 10, wherein the processing means is further configured for producing one or more maps of the surface features from the scattered photons ~~scattered from the surface features~~ during the one or more pulses of photons.

13. The apparatus of any one of Claims 10-12, wherein the processing means is further configured for producing one or more maps of the surface features from the fluoresced photons ~~fluoresced from the surface features~~ in-between the one or more pulses of photons.

14. The apparatus of any one of Claims 10-12, wherein the processing means comprises one or more computers or equivalent devices operable to classify the surface features ~~from the photon-detector-array signals~~ by contrasting one or more maps of the surface features derived from the scattered photons with one or more maps of the surface features derived from the fluoresced photons.

15. An apparatus, comprising:

~~a photon emitter configured to emit photons onto a surface of an article,~~

a photon detector array configured to receive both scattered and fluoresced photons from surface features of ~~the~~ an article; and

a processing means configured for:

processing photon-detector-array signals corresponding to ~~photons scattered from the surface features and photons fluoresced from the surface features~~ the scattered photons and the fluoresced photons received by the photon detector array during one or more pulses of photons and in-between the one or more pulses of photons, respectively, and,

~~wherein the processing means is further configured for~~ classifying the surface features ~~of the article~~ from the photon-detector-array signals corresponding to the scattered photons and the fluoresced photons.

16. The apparatus of Claim 15, further comprising a telecentric lens, wherein the telecentric lens is coupled to the photon detector array.

17. The apparatus of Claim 15, wherein classifying the surface features comprises classifying the surface features as inorganic or organic by contrasting photon-detector-array signals corresponding to the scattered photons ~~scattered from the surface features~~ and the fluoresced photons ~~fluoresced from the surface features~~.

18. The apparatus of any one of Claims 15-17, wherein the processing means is further configured for producing a map of the surface features from the scattered photons ~~scattered from the surface features~~.

19. The apparatus of any one of Claims 15-17, wherein the processing means is further configured for producing a map of the surface features from the fluoresced photons fluoresced ~~from the surface features~~.

20. The apparatus of any one of Claims 15-17, wherein the processing means comprises one or more computers or equivalent devices operable to classify the surface features ~~from photon-detector-array signals~~ by contrasting one or more maps of the surface features derived from the scattered photons with one or more maps of the surface features derived from the fluoresced photons.