CLAIMS

1. A disinfection device comprising

a collimator comprising a cone portion and an elongate portion, the cone portion shaped and dimensioned to receive a light emitting diode (LED) array or a laser diode and mountable onto a surface via a mounting assembly; and the elongate portion operable to reflect, diffract, or deflect light rays emitting from the LED array to form a narrowed light beam; and

wherein the LED array or laser diode comprises at least one UV-C emitter, and wherein the elongate portion comprises a nozzle having an opening for the narrowed light beam to exit therefrom, and the elongate portion comprises an internal surface coated with light/radiation reflective material.

2. The device of claim 1, wherein the light reflective material comprises polished aluminum and/or polished aluminum alloy.

3. The device of claim 1 or 2, wherein the at least one UV-C emitter is operable to emit a wavelength in a range of 270 nanometers to 280 nanometers.

4. The device of claim 2, wherein the polished aluminum alloy comprises at least 80% aluminum, and preferably is an aluminum alloy comprising aluminum, chromium, and magnesium.

5. The device of any one of the preceding claims, wherein the mounting assembly comprises a base plate, and the base plate, the collimator and the nozzle are integrally molded.

6. The device of claim 5, wherein the device is formed by an extrusion process or an additive manufacturing process.

7. The device of any one of the preceding claims, wherein the nozzle opening has a width of about 4 mm.

8. The device of any one of the preceding claims, wherein the device comprises at least one intensity sensor arranged to detect the intensity of the UV-C emission.

9. The device of any one of the preceding claims, wherein an internal surface of the collimator is coated with a photocatalyst.

10. A system for disinfection of an enclosed area having walls and a ceiling, comprising

a collimator mounted on a first wall surface or from a ceiling via a mounting assembly, at a height from the ceiling; the collimator containing an UV-C emitter and operable to emit a narrowed beam of UV-C radiation through a nozzle opening; and

a plurality of UV-C radiation sensors mounted on a second wall surface for detecting the UV-C radiation emitted from the collimator;

wherein the plurality of UV-C radiation sensors is arranged to detect at least two levels of UV-C radiation corresponding to two different regions on the second wall.

11. The system of claim 10, wherein the collimator is a device of any one of claims 1 to 9.

12. The system of claim 10 or 11, wherein the plurality of UV-C radiation sensors include at least one of a radiation dosimeter, a UV-C electronic sensor, a dosimeter card.

13. The system of claim 10, wherein the UV-C radiation sensors are arranged to detect three levels of UV-C radiation corresponding to three different regions on the second wall, wherein the three level comprises a first level associated with a UV-C radiation intensity capable of disinfection, a second level associated with a stray UV-C radiation intensity, and a third level associated with no UV-C radiation intensity.

14. The system of claim 13, further comprises at least one server arranged in signal communication with the collimator and to receive data from the plurality of UV-C radiation sensors via a feedback network, the at least one server operable to send a signal to stop emission of the UV-C radiation if the second level exceeds a predetermined threshold.

15. The system of any one of claims 10 to 14, wherein the collimator is positioned at a height in a range of 100mm to 300mm from the ceiling.

16. The system of any one of claims 10 to 15, wherein a first ratio of an illumination width by the narrowed beam of UV-C radiation projected on the second wall (a) to a distance of a nozzle opening to the UV-C radiation sensors (b) is equals to a second ratio of a nozzle width (x) to a distance of the UV-C emitter to the nozzle opening (a/b = x/y).

17. The system of any one of claims 10 to 16, further comprises an image capturing device configured to capture images associated with each of the plurality of UV-C radiation sensors.

18. A method for providing disinfection to an enclosed area having walls and a ceiling, comprising the steps of:

providing a collimator mounted on a first wall surface or mounted from the ceiling at a predetermined height from the ceiling; the collimator containing an UV-C emitter and operable to emit a narrowed beam of UV-C radiation through a nozzle opening;

providing a plurality of UV-C radiation sensors mounted on a second wall surface for detecting the UV-C radiation emitted from the collimator; and

arranging the plurality of UV-C radiation sensors to detect at least two levels of UV-C radiation corresponding to two different regions on the second wall.

19. The method of claim 18, wherein the step of arranging the plurality of UV-C radiation sensors is to detect three levels of UV-C radiation corresponding to three different regions on the second wall.

20. The method of claim 19, wherein the three different regions correspond to a germicidal zone, a stray zone, and a no-radiation zone.