Claims:

1. A mask for use in compressed sensing of incoming radiation, comprising:

a material that modulates an intensity of incoming radiation;

a plurality of mask aperture regions; and

one or more axes of rotational symmetry with respect to the plurality of mask aperture regions;

wherein each mask aperture region comprises at least one mask aperture that allows a higher transmission of the incoming radiation relative to other portions of each mask aperture region, a relative transmission being sufficient to allow a reconstruction of compressed sensing measurements, and

each of the at least one mask aperture has a shape that provides a symmetry under a rotation about the one or more axes of rotational symmetry; and

a mutual coherence of a sensing matrix generated by a rotation of the plurality of mask aperture regions is less than one.

2. The mask as claimed in claim 1, wherein the mutual coherence of the sensing matrix is expressed as $\mu(\varphi)$, where:

$$\mu(\varphi) = \max_{i \neq j} \left| \varphi_i^T \varphi_j \right|,$$

where φ is a matrix containing $M \times N^2$ rows of the sensing matrix, arising from M measurements and an N^2 pixel image, and φ_i and φ_j are columns of φ.

3. The mask as claimed in claim 1, wherein the mutual coherence of the sensing matrix is expressed as $\mu(\varphi)$, where:

$$\mu(\varphi) = \max_{i \neq j} \frac{\left| \varphi_i^T \varphi_j \right|}{\|\varphi_i\|_2 \left\|\varphi_j\right\|_2},$$

where φ is a matrix containing $M \times N^2$ rows of the sensing matrix, arising from M measurements and an N^2 pixel image, and φ_i and φ_j are columns of φ.

4. The mask as claimed in claim 1, wherein the mutual coherence of the sensing matrix is a minimized mutual coherence.

5. The mask as claimed in claim 1, further comprising:

(i) a cube or other Platonic solid,

(ii) a truncated icosahedral or other Archimedean solid, or

(iii) a cylinder.

6. The mask as claimed in claim 1, further comprising: a sphere.

7. A detector for compressed sensing of incoming radiation, comprising:

a mask as claimed in claim 1;

one or more radiation sensors within the mask and sensitive to the incoming radiation; and

a drive for rotating the mask about at least one of the one or more axes of rotational symmetry.

8. The detector as claimed in claim 7, further comprising:

a plurality of radiation sensors; and

a radiation shield arranged to mutually shield the plurality of radiation sensors.

9. A radiation detection method, comprising:

making compressed sensing measurements with a detector as claimed in claim 7

10. An imaging method, comprising:

imaging with the detector as claimed in claim 7.

11. The imaging method as claimed in claim 10, further comprising:

making optical images and/or infrared images of a field of view of the imaging system or a portion thereof; and

overlaying the optical images and/or infrared images and an image generated with the detector.

12. The radiation detection method as claimed in claim 9, further comprising any one of more of:

decommissioning a nuclear reactor, radiation safety monitoring or surveying, characterizing radioactive waste, security or defense monitoring, medical imaging, conducting a radiotherapy, conducting a particle therapy, conducting gamma-ray astronomy, conducting X-ray astronomy, remotely characterizing or detecting misalignments in a charged particle accelerator beam or in a radiation inducing beam, or enforcing border security.

13. The mask as claimed in claim 3, wherein the mutual coherence of the sensing matrix is a

minimized mutual coherence.

14. The mask as claimed in claim 3, further comprising:

(i) a cube or other Platonic solid,

(ii) a truncated icosahedral or other Archimedean solid,

(iii) a cylinder, or

(iv) a sphere.

15. The detector as claimed in claim 7, wherein the mutual coherence of the sensing matrix is expressed as $\mu(\varphi)$, where:

$$\mu(\varphi) = \max_{i \neq j} \left| \varphi_i^T \varphi_j \right|, \quad \text{or}$$

$$\mu(\varphi) = \max_{i \neq j} \frac{|\varphi_i^T \varphi_j|}{\|\varphi_i\|_2 \|\varphi_j\|_2},$$

where φ is a matrix containing $M \times N^2$ rows of the sensing matrix, arising from M measurements and an N^2 pixel image, and φ_i and φ_j are columns of φ; and

the mutual coherence of the sensing matrix is a minimized mutual coherence.

16. The detector as claimed in claim 7, wherein the mutual coherence of the sensing matrix is expressed as $\mu(\varphi)$, where:

$$\mu(\varphi) = \max_{i \neq j} \left| \varphi_i^T \varphi_j \right|, \quad \text{or}$$

$$\mu(\varphi) = \max_{i \neq j} \frac{|\varphi_i^T \varphi_j|}{\|\varphi_i\|_2 \|\varphi_j\|_2},$$

where φ is a matrix containing $M \times N^2$ rows of the sensing matrix, arising from M measurements and an N^2 pixel image, and φ_i and φ_j are columns of φ; and

the mask further comprises

(i) a cube or other Platonic solid,

(ii) a truncated icosahedral or other Archimedean solid,

(iii) a cylinder, or

(iv) a sphere.