Claims:

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

a body formed of a material that modulates an intensity of incoming radiation of interest; and

wherein the body has a plurality of mask aperture regions, each comprising at least one mask aperture that allows a higher transmission of the radiation relative to other portions of the respective mask aperture region, the relative transmission being sufficient to allow reconstruction of the compressed sensing measurements;

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

the mask apertures have a shape that provides symmetry after a rotation about the one or more axes of rotational symmetry; and

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

2. A mask as claimed in claim 1, wherein the mutual coherence 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. A mask as claimed in claim 1, wherein the mutual coherence 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. A mask as claimed in any one of the preceding claims, wherein the mutual coherence of the mask apertures is a minimized mutual coherence.

5. A mask as claimed in any one of the preceding claims, wherein the mask is (i) a cubic or other Platonic solid, or (ii) a truncated icosahedral or other Archimedean solid, or (iii) cylindrical.

6. A mask as claimed in any one of claims 1 to 4, wherein the mask is spherical, wherein the mask aperture regions are defined such that the mask has the one or more axes of rotational symmetry with respect to the mask aperture regions.

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

a mask as claimed in any one of the preceding claims;

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

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

8. A detector as claimed in claim 7, comprising a plurality of radiation sensors and a radiation shield arranged to mutually shield said radiation sensors.

9. A radiation detection method, comprising:

making compressed sensing measurements with a detector as claimed in either claim 7 or 8.

10. An imaging system for compressed sensing of incoming radiation, the imaging system comprising:

a mask as claimed in any one of claims 1 to 6;

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

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

11. An imaging system as claimed in claim 10, comprising a plurality of radiation sensors and a radiation shield arranged to mutually shield said radiation sensors.

12. An imaging method, comprising imaging with the imaging system of either claim 10 or 11.

13. An imaging method as claimed in claim 12, further comprising making optical and/or infrared images of the field of view of the imaging system or a portion thereof, and overlaying the optical and/or infrared images and an image generated with the imaging system.

14. A method of nuclear reactor decommissioning, radiation safety monitoring or surveying, radioactive waste characterisation, security or defence monitoring, medical imaging,

radiotherapy, particle therapy, gamma-ray astronomy, X-ray astronomy, remote characterisation or detection of misalignments in a charged particle accelerator beam or in a radiation inducing beam, or border security, the method comprising a radiation detection method as claimed in claim 9 or an imaging method as claimed in claim 12.

15. A system for use in nuclear reactor decommissioning, radiation safety monitoring or surveying, radioactive waste characterisation, security or defence monitoring, medical imaging, radiotherapy, particle therapy, gamma-ray astronomy, X-ray astronomy, remote characterisation or detection of misalignments in a charged particle accelerator beam or in a radiation inducing beam, or border security, the system comprising a detector as claimed in claim 7 or an imaging system as claimed in claim 10.