What is claimed is:

1. A method of making an apparatus suitable for detecting x-ray, the method comprising:

obtaining a substrate having a first surface and a second surface,

wherein the substrate comprises an electronics system in or on the substrate,

wherein the substrate comprises a plurality of electric contacts are on the first surface;

obtaining a first chip comprising a first X-ray absorption layer,

wherein the first X-ray absorption layer comprises an electrode;

bonding the first chip to the substrate such that the electrode of the first X-ray absorption layer is electrically connected to at least one of the electrical contacts; and

obtaining a second chip comprising a second X-ray absorption layer, wherein the second X-ray absorption layer comprises an electrode, and bonding the second chip to the substrate such that the electrode of the second X-ray absorption layer is electrically connected to at least one of the electrical contacts.

2. The method of claim 1, further comprising mounting a backing substrate to the first chip such that the first chip is sandwiched between the backing substrate and the substrate.

3. The method of claim 1, wherein a gap between the first chip and the second chip is less than 100 microns.

4. The method of claim 1, wherein the first chip is smaller in area than the substrate.

5. The method of claim 1, wherein a ratio between a thermal expansion coefficient of the first chip and a thermal expansion coefficient of the substrate is two or more.

6. The method of claim 1, wherein the first X-ray absorption layer comprises silicon, germanium, GaAs, CdTe, CdZnTe, or a combination thereof.

7. The method of claim 1, wherein the first X-ray absorption layer is doped with chromium.

8. The method of claim 1, wherein the first X-ray absorption layer has a thickness of 200 microns or less.

9. The method of claim 1, wherein the first chip comprises a redistribution layer (RDL) on the second surface.

10. The method of claim 1, wherein the first chip comprises a via, wherein the via extends from the first surface to the second surface.

11. The method of claim 1, wherein the electronics system comprises:

a first voltage comparator configured to compare a voltage of the electrode to a first threshold;

a second voltage comparator configured to compare the voltage to a second threshold;

a counter configured to register a number of X-ray photons reaching the first X-ray absorption layer;

a controller;

wherein the controller is configured to start a time delay from a time at which the first voltage comparator determines that an absolute value of the voltage equals or exceeds an absolute value of the first threshold;

wherein the controller is configured to activate the second voltage comparator during the time delay;

wherein the controller is configured to cause the number registered by the counter to increase by one, if the second voltage comparator determines that an absolute value of the voltage equals or exceeds an absolute value of the second threshold.

12. The method of claim 11, wherein the electronics system further comprises a capacitor module electrically connected to the electrode of the first X-ray absorption layer, wherein the capacitor module is configured to collect charge carriers from the electrode of the first X-ray absorption layer.

13. The method of claim 11, wherein the controller is configured to activate the second voltage comparator at a beginning or expiration of the time delay.

14. The method of claim 11, wherein the electronics system further comprises a voltmeter, wherein the controller is configured to cause the voltmeter to measure the voltage upon expiration of the time delay.

15. The method of claim 14, wherein the controller is configured to determine an X-ray photon energy based on a value of the voltage measured upon expiration of the time delay.

16. The method of claim 11, wherein the controller is configured to connect the electrode of the first X-ray absorption layer to an electrical ground.

17. The method of claim 11, wherein a rate of change of the voltage is substantially non-zero at expiration of the time delay.

18. The method of claim 11, wherein a rate of change of the voltage is substantially non-zero at expiration of the time delay.

19. The method of claim 1, wherein the first X-ray absorption layer comprises a diode.