Claims:

1. A system for obtaining temperature corrected photometric data, the system comprising:

a silicon photomultiplier device; and

at least one processor configured with software instructions for:

activating the silicon photomultiplier device in a forward bias mode by a forward bias mode input signal;

measuring, by the at least one processor, a forward bias mode response signal;

determining, by the at least one processor, a first temperature of the silicon photomultiplier device according to the forward bias mode input signal and the forward bias mode response signal;

determining, by the at least one processor, an operational reverse bias mode voltage;

activating the silicon photomultiplier device in an operational reverse bias mode by the operational reverse bias mode voltage;

exposing the silicon photomultiplier device to light from a target object;

determining a second temperature after exposing the silicon photomultiplier device to the light;

measuring an output signal from the silicon photomultiplier device; and

determining an intensity of the light according to the output signal and a silicon photomultiplier device gain.

2. The system of claim 1, wherein the at least one processor is further configured for determining the operational reverse bias mode voltage according to a temperature required to maintain a predetermined silicon photomultiplier device gain in the silicon photomultiplier device.

3. The system of claim 1, wherein the at least one processor is further configured for determining the silicon photomultiplier device gain according to the first temperature and the operational reverse bias mode voltage.

4. The system of claim 1, wherein activating the silicon photomultiplier device includes applying a fixed current as the forward bias mode input signal.

5. The system of claim 1, wherein activating the silicon photomultiplier device in the forward bias mode includes applying a fixed voltage as the forward bias mode input signal.

6. The system of claim 1, wherein the at least one processor is further configured for determining the first temperature of the silicon photomultiplier device by employing a correlation between a diode voltage and a diode current in the forward bias mode.

7. The system of claim 1, wherein the target object includes at least one sample contained in a sample well of a multi-well plate, the at least one processor being further configured for:

activating the sample well to cause a luminescent reaction in the at least one sample to produce the light.

8. The system of claim 1, wherein the target object includes at least one sample contained in a sample well of a multi-well plate, the at least one processor being further configured for:

determining an assay measurement according to the intensity of the light.

9. The system of claim 1 wherein the silicon photomultiplier device includes a plurality of photo-avalanche diodes.

10. A method for obtaining temperature corrected photometric data by a silicon photomultiplier device, the method comprising:

activating the silicon photomultiplier device in a forward bias mode by a forward bias mode input signal;

measuring, by at least one processor, a forward bias mode response signal;

determining, by the at least one processor, a first temperature of the silicon photomultiplier device according to the forward bias mode input signal and the forward bias mode response signal;

determining, by the at least one processor, an operational reverse bias mode voltage;

activating the silicon photomultiplier device in an operational reverse bias mode by the operational reverse bias mode voltage;

exposing the silicon photomultiplier device to light from a target object;

determining a second temperature after exposing the silicon photomultiplier device to the light;

measuring an output signal from the silicon photomultiplier device; and

determining an intensity of the light according to the output signal and a silicon photomultiplier device gain.

11. The method of claim 10, further comprising determining the operational reverse bias mode voltage according to a temperature required to maintain a predetermined silicon photomultiplier device gain in the silicon photomultiplier device.

12. The method of claim 10, further comprising determining the silicon photomultiplier device gain according to the first temperature and the operational reverse bias mode voltage.

13. The method of claim 10, wherein activating the silicon photomultiplier device includes applying a fixed current as the forward bias mode input signal.

14. The method of claim 10, wherein activating the silicon photomultiplier device in the forward bias mode includes applying a fixed voltage as the forward bias mode input signal.

15. The method of claim 10, further comprising determining the first temperature of the silicon photomultiplier device by employing a correlation between a diode voltage and a diode current in the forward bias mode.

16. The method of claim 10, wherein the target object includes at least one sample contained in a sample well of a multi-well plate, the method further comprising:

activating the sample well to cause a luminescent reaction in the at least one sample to produce the light.

17. The method of claim 10, wherein the target object includes at least one sample contained in a sample well of a multi-well plate, the method further comprising:

determining an assay measurement according to the intensity of the light.

18. The method of claim 10, wherein the forward bias mode input signal is a first forward bias mode input signal and the forward bias mode response signal is a first forward bias mode response signal, the method further comprising:

activating the silicon photomultiplier device in the forward bias mode by a second forward bias mode input signal;

measuring, by the at least one processor, a second forward bias mode response signal; and

wherein determining the first temperature of the silicon photomultiplier device according to the forward bias mode input signal and the forward bias mode response signal includes determining the first temperature of the silicon photomultiplier device according to the first forward bias mode input signal, the first forward bias mode response signal, the second forward bias mode input signal, and the second forward bias mode response signal.

19. A non-transitory computer-readable medium configured with software instructions to cause execution of a method by at least one processor, the method comprising:

activating a silicon photomultiplier device in a forward bias mode by a forward bias mode input signal;

measuring, by at least one processor, a forward bias mode response signal;

determining, by the at least one processor, a first temperature of the silicon photomultiplier device according to the forward bias mode input signal and the forward bias mode response signal;

determining, by the at least one processor, an operational reverse bias mode voltage;

activating the silicon photomultiplier device in an operational reverse bias mode by the operational reverse bias mode voltage;

exposing the silicon photomultiplier device to light from a target object;

determining a second temperature after exposing the silicon photomultiplier device to the light;

measuring an output signal from the silicon photomultiplier device; and

determining an intensity of the light according to the output signal and a silicon photomultiplier device gain.

20. The non-transitory computer-readable medium of claim 19, wherein the method further comprises determining the operational reverse bias mode voltage according to a temperature required to maintain a predetermined silicon photomultiplier device gain in the silicon photomultiplier device.

21. The non-transitory computer-readable medium of claim 19, wherein the method further comprises determining the silicon photomultiplier device gain according to the first temperature and the operational reverse bias mode voltage.

22. The non-transitory computer-readable medium of claim 19, wherein activating the silicon photomultiplier device includes applying a fixed current as the forward bias mode input signal.

23. The non-transitory computer-readable medium of claim 19, wherein activating the silicon photomultiplier device in the forward bias mode includes applying a fixed voltage as the forward bias mode input signal.

24. The non-transitory computer-readable medium of claim 19, wherein the method further comprises determining the first temperature of the silicon photomultiplier device by employing a correlation between a diode voltage and a diode current in the forward bias mode.

25. The non-transitory computer-readable medium of claim 19, wherein the target object includes at least one sample contained in a sample well of a multi-well plate, the method further comprising:

activating the sample well to cause a luminescent reaction in the at least one sample to produce the light.

26. The non-transitory computer-readable medium of claim 19, wherein the target object includes at least one sample contained in a sample well of a multi-well plate, the method further comprising:

determining an assay measurement according to the intensity of the light.