

ABSTRACT

Disclosed in the present invention is a single-photon detector cooling control method and system adaptive to temperature and TEC performance changes. The method limits the maximum working voltage of a TEC, monitors in real time a working voltage and a cooling
5 temperature of the TEC, and automatically adjusts a target temperature and an APD working bias voltage according to a monitoring result, so as to effectively guarantee that the single-photon detector can still work stably when the working environment temperature is too high or the TEC performance is degraded. Meanwhile, when the environment temperature recovers to a normal temperature range, the present invention allows a cooling target temperature of the
10 TEC to be recovered to an initial cooling target temperature, and synchronously adjusts the APD working bias voltage, so that the performance indexes of the single-photon detector, such as the detection efficiency, the dark count rate, the afterpulse probability, are synchronously recovered to a normal state, thus effectively prolonging the service life of TECs and single-photon detector devices, and improving the environmental adaptability of single-photon
15 detectors.

[Fig. 2]