SUMMARY

According to a first aspect, the present disclosure refers to a light detection system comprising: a first photodetector array comprising: a first photodetector and a second photodetector; and a first optical adjustment component configured to propagate light directly from the first photodetector to the second photodetector; a second photodetector array comprising: a third photodetector and a fourth photodetector; and a second optical adjustment component configured to propagate light directly from the third photodetector to the fourth photodetector; and a third optical adjustment component positioned in an optical path between the first photodetector array and the second photodetector array, wherein the third optical adjustment component is configured to propagate light from the first photodetector array to the second photodetector array.

According to a second aspect, the present disclosure refers to a system comprising: a light source; and a light detection system according to the first aspect.

According to a third aspect, the present disclosure refers to a method comprising: detecting light from a flow stream with a light detection system according to the first aspect.

Examples of the present disclosure include light detection systems having two or more photodetector arrays. Systems according to certain examples include a first photodetector array in optical communication with a second photodetector array, each photodetector array having two or more photodetectors (e.g., photomultiplier tubes) and an optical adjustment component positioned in an optical path between the photodetector arrays. In some examples, the optical adjustment component is a collimator that collimates light between photodetector arrays. The optical adjustment component may include a beam splitter or a wavelength separator. An optical adjustment component may also be positioned adjacent to one or more photodetectors in the photodetector arrays. In some instances, a dichroic mirror is positioned adjacent to one or more photodetectors in the photodetector arrays. Systems may include additional photodetector arrays, such as a third photodetector array, a fourth photodetector array, a fifth photodetector array, a sixth photodetector array, a seventh photodetector array, an eighth photodetector array, a ninth photodetector array and including a tenth photodetector array. In these systems, an optical adjustment

component (e.g., collimator, beam splitter, wavelength separator) may be positioned between each additional photodetector array. Systems may also include an aligner for aligning and a connector for coupling together two photodetector arrays. In examples, the subject light detection systems have a proximal end having an orifice for receiving light and a distal end. In some instances, the proximal end of the light detection system is the first photodetector array.

Examples of the present disclosure also include systems for measuring light from a sample (e.g., in a flow stream). In certain examples, systems include a light source and a light detection system that detects one or more wavelengths of light having a first photodetector array in optical communication with a second photodetector array and an optical adjustment component positioned in an optical path between the photodetector arrays. In some examples, systems also include an optical collection system for propagating light to the light detection system. The optical collection system may be a free-space light relay system or may include fiber optics such as a fiber optics light relay bundle. In some examples, the system is a flow cytometer.

Examples of the disclosure also include methods for irradiating a sample (e.g., in a flow stream) in an interrogation field with a light source, collecting and detecting light

What is claimed is:

1. A light detection system comprising:

a first photodetector array comprising:

a first photodetector and a second photodetector; and

a first optical adjustment component configured to propagate light directly from the first photodetector to the second photodetector;

a second photodetector arraycomprising:

a third photodetector and a fourth photodetector; and

a second optical adjustment component configured to propagate light directly from the third photodetector to the fourth photodetector; and

a third optical adjustment component positioned in an optical path between the first photodetector array and the second photodetector array, wherein the third optical adjustment component is configured to propagate light from the first photodetector array to the second photodetector array.

2. The light detection system according to claim 1, wherein the third optical adjustment component comprises a collimator that collimates light between the first photodetector array and the second photodetector array.

3. The light detection system according to any one of claims 1-2, wherein the third optical adjustment component comprises a beam splitter.

4. The light detection system according to any one of claims 1-3, wherein the third optical adjustment component comprises a wavelength separator.

5. The light detection system according to any one of claims 1-4, wherein the third optical adjustment component comprises a dichroic mirror.

6. The light detection system according to any one of claims 1-5, wherein two or more optical adjustment components are positioned between the first photodetector array and the second photodetector array.

7. The light detection system according to claim 6, wherein the two or more optical adjustment components positioned between the first photodetector array and the second photodetector array comprise a dichroic mirror and a collimator.

8. The light detection system according to any one of claims 1-7, wherein the first optical adjustment component comprises a dichroic mirror positioned adjacent to the first photodetector in the first photodetector array.

9. The light detection system according to any one of claims 1-8, wherein the system further comprises:

a third photodetector array; and

a fourth optical adjustment component positioned in an optical path between the second photodetector array and the third photodetector array, wherein the fourth optical adjustment component is configured to propagate light from the second photodetector array to the third photodetector array.

10. The light detection system according to any one of claims 1-9, wherein the photodetector arrays are positioned along a single axis or along more than one axis.

11. The light detection system according to any one of claims 1-10, wherein the photodetector arrays have a polygonal configuration in the light detection system.

12. The light detection system according to any one of claims 1-11, wherein each photodetector array comprises an aligner for aligning two or more photodetector arrays.

13. The light detection system according to any one of claims 1-12, where the photodetectors are photomultiplier tubes.

14. A system comprising:

a light source; and

a light detection system according to any one of claims 1 to 13.

15. A method comprising:

detecting light from a flow stream with a light detection system according to any one of claims 1 to 13.