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Statistical Treatment of Photon/Electron Counting; Extending the Linear Dynamic Range from the Dark Count Rate to Saturation

A novel photon counting method uses discriminator-based event counting to achieve a seven-order-of-magnitude linear dynamic range and high contrast, improving quantitation for microscopy and spectroscopy applications.

Photon counting is a well-established method for detecting low intensity light. However, conventional approaches for photon counting suffer from nonlinearities at high count rates. Several strategies have been adopted for improving the linear dynamic range, but suffer from issues, such as long analysis times and sensitivity differences between instruments.

Researchers at Purdue University have developed a simple photon counting method that provides seven orders of magnitude in linear dynamic range for a single photomultiplier tube detector. This method acquires data by using discriminator-based event counting electronics to measure the count output of a detector. In addition, it bridges an existing gap in maintaining quantitation over measurements with high contrast and has potential application in microscopy and spectroscopy.

Advantages:

-High contrast

-Seven orders of magnitude

Potential Applications:

-Microscopy

-Spectroscopy

TRL: 3

Technology ID
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Category
Computing/Photonic & Optical Computing Technologies
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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Intellectual Property:

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