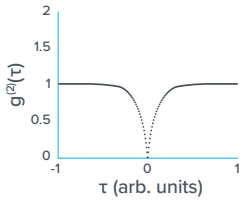
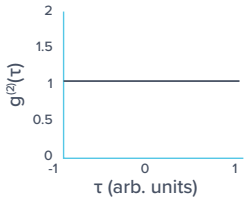
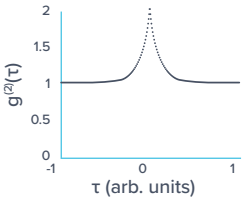
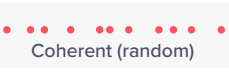
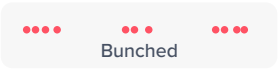
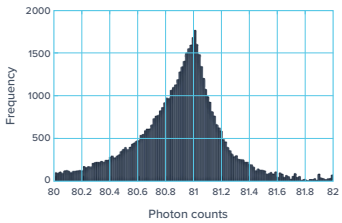
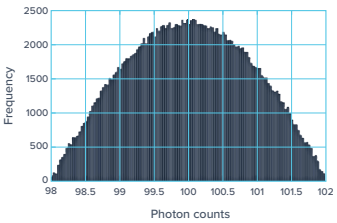
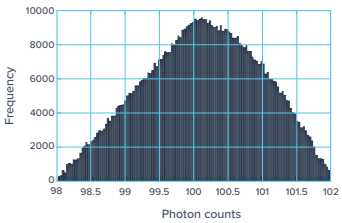
LIQUID INSTRUMENTS

Analyzing photon statistics

Characterizing photon behavior with a Time & Frequency Analyzer allows researchers to determine what kind of photon-number distribution the light source emits. Photon arrival times can reveal whether photons are arriving spread out, randomly, or bunched together. Second-order correlation functions, $g^{(2)}(\tau)$, then help determine quantum state classification.

Reference the table below to understand how the second-order correlation functions, photon arrival times, and photon probability distributions relate to one another.

	Antibunching (quantum)	Coherent (random)	Bunching (chaotic)
$g^{(2)}(\tau)$	$g^{(2)}(0) < 1$ 	$g^{(2)}(0) = 1$ 	$g^{(2)}(0) > 1$ 
Photon arrival	 Antibunched	 Coherent (random)	 Bunched
Probability distribution			
Statistical model	Sub-Poissonian	Poissonian	Super-Poissonian

To learn more tips and strategies for fast, flexible photon counting and analysis with reconfigurable instrumentation, download the guide here.

Have questions? Contact us to speak with an engineer.