

CSU PHYSICS COLLOQUIUM

“Quantum Ghost Imaging”

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Monday, March 27th at 4:00 PM

120 Engineering (Hammond Auditorium)

Abstract

Ghost imaging is a new approach to observing samples with extremely low light levels. For biological samples, such as plants, low light conditions are necessary so as not to interrupt or interfere with the native metabolic processes. However, when light sources are very low, background noise from cameras typically overwhelms the small amount of signal. NCam, a unique imager developed at Los Alamos National Laboratory, allows us to increase measurement sensitivity for ghost imaging. With NCam, we can observe the development of living plants using less light than they would encounter from starlight. Highly correlated photon pairs generated by spontaneous parametric down conversion are used for this imaging method to suppress detector noise, leveraging quantum-effects for imaging applications. I will discuss various quantum-enabled microscopy methods, ghost imaging, and the use of NCam to image plants.

Biography

Duncan Ryan is a research scientist in the Center for Integrated Nanotechnologies at Los Alamos National Laboratory. Duncan has an M.S. and PhD in physics from Colorado State University where he studied the photophysics of nanocrystals. His work has involved the development of several novel microscopy methods, including light-sheet techniques for bioimaging, 3D particle tracking, polarization-resolved super-resolution microscopy, and quantum-enabled microscopy.

