Old Dominion University
Department of Physics

Colloquium

Tuesday, September 20, 2016

"The Large-Area Picosecond Photon Detector (LAPPD^{TM}), and Applications in Quantum Optics"

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Abstract: A novel photon-detector technology [1], developed recently by a collaboration of Universities, National Laboratories, and Industry, is offering a set of parameters that make it very interesting for quantum-optical applications. LAPPD^{TM} is an ultrafast imaging detector with single-photon sensitivity, based on large (20 cm by 20 cm) microchannel plates that amplify signals from a photocathode, and ultrafast waveform sampling electronics.

It can supply a continuous stream of photon-detection events, resolved spatially to about 0.5 X 0.5 mm^2 on an area of 20 X 20 cm^2, and temporally to about 50 ps. With further development, a 10^2-fold improvement in the spatial resolution and a better-than 10-fold improvement in the time resolution are anticipated. With electromagnetic-field modes matched to these resolution elements, it is then possible to determine photon-occupation numbers on a per-mode basis, and in a large phase-space volume. Transverse mode matching can be achieved with diffraction- limited magnification optics, and longitudinally, spectral filtering can be used for coherence times matching the 50-ps time resolution.

Possible applications of this detector will be discussed in photon-correlation experiments of the Hanbury Brown - Twiss type, such as thermal-light ghost imaging.

References

[1] For references and other information, please visit psec.uchicago.edu.

Presentation: OCNPS 200 @ 3:00 pm
Refreshments: OCNPS Atrium @ 2:30 pm

All interested persons are cordially invited to attend.