

Department of Physics & Astronomy

General Colloquium

Thursday, February 26th, 2026

PHYS 112 at 3:30 pm

Refreshments will be served at 3:00pm in PHYS 242

Professor Vladimir Shalaev

**Bob and Anne Burnett Distinguished Professor of Electrical and Computer
Engineering
Purdue University**

Quantum Photonics and Space-Time Metamaterials

In this talk we first discuss quantum photonic integrated circuitry (qPIC) based on the recently discovered single-photon emitters in silicon nitride and the avalanche-enhanced optical modulation in silicon at single-photon intensities. Then, we show that transparent conducting oxides (TCOs) operating in the near-zero index (NZI) regime can provide strong single-light-cycle modulation, enabling novel optical phenomena in such extreme time-varying media, including photonic time crystals and 4D space-time metamaterials.