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Quantum plasmonics with nitrogen-vacancy centers in diamond

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Integrated quantum photonics imposes very stringent and often contradictory requirements on the design of integrated optical components. Plasmonic materials promise to confer novel properties to integrated quantum devices, that are not achievable with dielectric materials, such as nanoscale footprint, ultrafast operation and very strong light-matter interaction. In this talk, we will focus on the advantages of plasmonics for producing single photons. Our single-photon source is based on a nitrogen-vacancy center in diamond in a gap-plasmon cavity. It features a 200-fold speed-up in emission and a 30-fold increase in detected photon count compared to a reference source made without the plasmonic cavity. We discuss the potential of this enhancement mechanism for the engineering of tomorrow's quantum photonic systems.

Biography

Simeon Bogdanv has received his PhD from the group of Manijeh Razeghi at Northwestern University in 2014. He is currently a Post-doctoral Research Associate at Purdue University in the group of Vladimir M Shalaev. His research interests include optoelectronic devices and quantum nanophotonics. His scientific achievements include the fabrication of InAs/GaSb superlattice photodetectors operating at 10 μm with the lowest dark current and the world's brightest single-photon source based on a nitrogen-vacancy center in diamond. He is Member of the Optical Society of America and serves as Reviewer for journals such as *Optics Express, Optics Materials Express, Optics Letters* and *Nanophotonics*.

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