



## **Solid state nano-photonic quantum technologies**

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### Abstract:

In this talk I give an overview of the research in the Nanoscale and Quantum Optics Lab at Caltech. In the first part, I present optical elements based on sub-wavelength structures that enable excellent control of the phase and amplitude of free-space optical fields. These structures consist of two-dimensional patterns etched directly in a thin layer of material with a high index of refraction (such as silicon). In particular, we are interested in using this technology to design flat lenses and mirrors that can be further integrated in ultra-slim focus scanning devices, retro-reflectors and spatial light phase modulators. In the second part of the talk I present quantum optical devices based on solid-state light emitters such as rare-earth ions integrated in nano-photonic optical resonators. I discuss our progress in fabricating and measuring these devices and the prospects of using them for quantum communications.

### Biography:

Andrei Faraon graduated from Stanford University (Stanford, CA, USA) with a PhD (2009) in Applied Physics and a MS (2009) in Electrical Engineering. He did his undergraduate studies at California Institute of Technology (Pasadena, CA, USA) where he graduated with a BS with honors in Physics (2004). He published over 30 journal articles and coauthored two book chapters. Andrei was born and raised in Falticeni, Jud. Suceava, Romania.

References: <http://scholar.google.com/citations?user=LRA9jVEAAAAJ&hl=en&oi=ao>