Controlling amplitude, phase, polarization and spectral properties of light using silicon metasurfaces

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In this talk I will describe our recent progress related to dielectric metasurfaces. Our structures allow the control of phase, amplitude polarization and spectral degrees of freedom. In particular, amorphous silicon nano structures are used generate strong resonances in the near IR regime. We present a novel configuration for the generation of fully planar metasurface structure, offering the possibility to place additional layers on top. In addition, it is now possible to perform post-trimming of our metasurface such that fabrication inaccuracies can be compensated for. This last property makes the metasurface more appealing for real life applications in realistic conditions. Following this demonstration, we demonstrate real-time tunability of metasurface by incorporating atomic media into the structure such that quantum photonics properties are utilized. Finally, we demonstrate the usefulness of our approach by presenting a metalens with improved capabilities.