

Metasurfaces for High Efficiency Photoelectric Effect in Silicon

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Abstract:

In this project, we intend to design silicon metasurfaces in which phonon and photon of different momenta can be confined. We will be working on a configuration based on a Si thin film with a periodic array of nanoresonators erected on its surface. The effect of resonators size and shape on the confinement of photons and phonons will be investigated. We will be looking for configurations that drastically suppress the light scattering losses by field confinement and promote the interaction of the confined field with phonons confined in the surface layers of the resonators. The accomplishment of this project is expected to help to gain more insight into the confinement of phonons and photons and rationally design metasurfaces of high photovoltaic efficiency, contributing significantly to the efforts done so far to develop alternative energy technologies.