



(a) Refractive transmission at conventional dielectric interface: the maximum transmission angle is limited to $\sim 15^\circ$ for air-to-Si (a).

(b) High-throughput, glancing-angle transmission through vertical-dipole, nano-optic textured surface . The range of incident angle for high-throughput transmission is now shifted to the oblique direction.

(c) & (d) Solar panels with nano-optic-textured cells results in higher efficiency over the course of the entire day without mechanical tracking apparatus.