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Active Core-Shell Nanowire Optical Antenna Absorbers[1] CARLOS ASPETTI, CHANG-HEE CHO, RITESH AGARWAL, Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA — Core-shell dielectric-metal nanoparticles have demonstrated tunability of their absorption properties due to the size- and shape-dependence of the surface plasmon resonance. Recently, the core-shell semiconductor-insulator-metal nanowire was examined as a platform for manipulating the core emitter lifetimes due to the highly confined and intense electromagnetic fields mediated by whispering gallery surface plasmon polariton modes. Combining these two concepts we realize an active semiconductor-insulator-metal optical antenna, which demonstrates a highly tunable absorption spectrum. By directly contacting the semiconductor core, photocurrent data is coupled with simulations to show highly tunable, significant broad-band absorption enhancement; a general result for a range of material systems.

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