How to couple light to graphene plasmons

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Abstract

Graphene plasmons promise exciting nanophotonic and optoelectronic applications. Owing to their extremely short wavelengths, however, the efficient coupling of photons to graphene plasmons - critical for the development of future devices - can be challenging. Here, we demonstrate (both theoretically and experimentally) various coupling mechanisms between infrared photons and propagating graphene plasmons (see Fig 1). We discuss and compare coupling efficiencies in different configurations: tapered polaritonic waveguide [1], metallic antenna [2], periodic grating, nanotube coupler, etc. Some of the proposed coupling devices allow for an efficient conversion of the incident photon energy into graphene plasmons and, therefore, could become an efficient route towards graphene plasmon circuitry.

References

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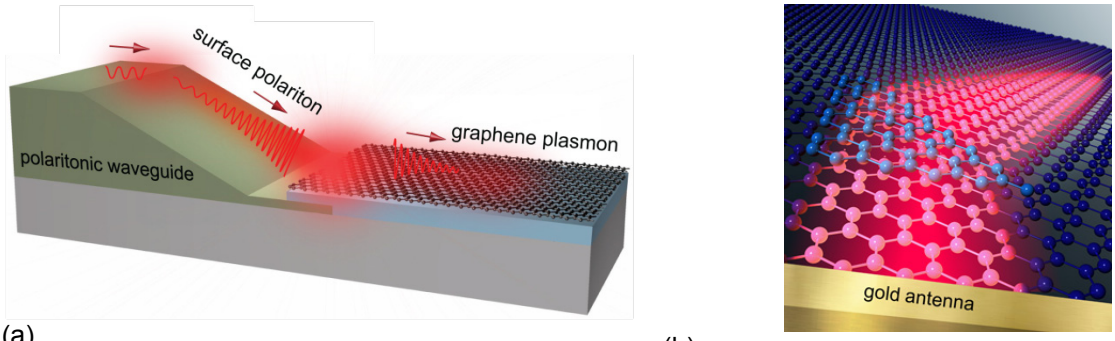

(a) (b)

Figure 1 Schematic of the couplers for graphene plasmons. (a) tapered polaritonic waveguide [1]. (b) gold antenna [2].