# Coupling light into graphene plasmons with the help of surface acoustic waves

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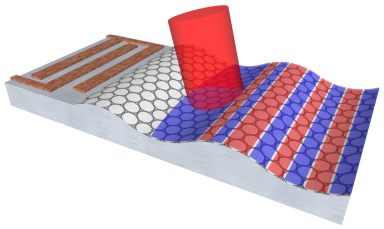
Surface plasmon polaritons (for short, plasmons) are essentially light waves trapped to the surface of a conductor due to their interaction with the conduction electrons. Compared to usual propagating light, plasmons have a much shorter wavelength, which opens the door to nano-optical applications otherwise inhibited by the diffraction limit of conventional optics. Potential applications of plasmonics include integrated optoelectronic circuits, the control of quantum emitters in quantum computing, chemical sensors for single molecule detection, and nanomedicine.

Recently, the possibility to use graphene for plasmonic devices received considerable attention[1]. In comparison to conventional conductors, graphene offers unique possibilities for tuning its plasmonic properties. However, an efficient method to excite propagating graphene plasmons for the use in integrated, scalable devices is so far still lacking. Trying to overcome this problem, we recently proposed a method to couple light into graphene plasmons by periodically deforming an extended graphene sheet with electrically generated surface acoustic waves[2]. Independently, another research group arrived at a similar proposal[3] (also see the popular science articles in *Physics*[4] and *Chemistry World*[5]).



A sketch of our proposed device to couple laser light into propagating graphene plasmons.

In our talk, we want to give a short review about graphene plasmonics, its possible applications, and about the different methods used so far in the generation of graphene plasmons. We then explain our novel approach, which avoids patterning the graphene sheet, therefore minimizes plasmon loss through edge scattering, and allows to electrically switch the laser-plasmon coupling.

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## References

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[5] *Vibrations couple light to graphene*, Chemistry World, http://www.rsc.org/chemistryworld/2013/12/vibrations-couple-light-graphene-plasmons.