Abstract Submitted
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Graphene-based Optical Modulator MING LIU, XIANG ZHANG, UC Berkeley — Data communications have been growing at a speed even faster than Moore's Law, with a 44-fold increase expected within the next 10 years. Data Transfer on such scale would have to recruit optical communication technology and inspire new designs of light sources, modulators, and photodetectors. The past decade has seen the flourish of researches in silicon-based optical modulators. However, their performance is limited by the weak refractive index changes in silicon, and consequently large footprint and stringent fabrication tolerance are required. Here we raise a totally new mechanism for optical modulation. Instead of changing the refractive index in silicon, we use graphene as an active layer and change its absorption coefficient by turning on/off the interband transitions. This turning is realized through shifting the Fermi level by simply a back gate. In this way, we can operate the optical modulator at a relatively high speed (1.2 GHz) over a broad range (1.3 to 1.6 μm), while keep the smallest footprint ($\sim$25 μm^2). More details of the device will be discussed in the talk.

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