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Graphene devices and its performance limitations and opportunities

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Being a two-dimensional membrane, its mechanical properties such as morphology, strains, phonons can significantly modifies the electronic properties of graphene. In fact, the coupling between the mechanical and electronic properties of graphene plays a key limiting role in the performance of electronics and optoelectronics devices. Modeling studies of several in-house experiments will be discussed to exemplify this point. Next, I will discuss how the modification of electronic properties of graphene via mechanical strains might lead to interesting electronics and electromechanical devices.