

Quantum Sticking of Cold Atomic Hydrogen to Graphene

Abstract

When an atom of hydrogen impinges normally on a suspended graphene surface it has a finite probability of sticking that normally would be calculated using Fermi's golden rule. This sticking occurs by via a transfer of energy from the incident particle to the membrane creating a phonon (lattice vibration) in the graphene surface. The previous work done on this problem demonstrates that perturbative techniques such as Fermi's golden rule break down beyond second order, therefore a non-perturbative technique is required to accurately determine the sticking probability. I have examined the specific mechanism of just how these perturbative techniques break down, and will offer a non-perturbative solution to this problem.