【NS-01】

Electron Tunneling under High Electric Fields and the Charge Redistribution under STM Fields in Carbon Nanotubes and Nanopeapods

원지순
서울대학교 물리학부

Electronic transport and tunneling under high electric fields is studied beyond the linear response theory. The charge redistribution of the carbon nanotube coated with the MgO or BN film under high electric fields is calculated using the first-principles pseudopotential method and the self-consistent potential profile is obtained. The behavior of electrons around threshold voltage above which substantial electron tunneling occurs is examined in detail. In the situation of the Scanning Tunneling Microscopy, the dielectric response and the potential profile of semiconducting nanotubes are investigated. Under a finite bias voltage, the charge redistribution of a semiconducting carbon nanotube sample is calculated and the shift of individual electronic states of the sample for a given electric field is analyzed. Theoretical results are shown to be in good agreement with recent field emission and STM data.