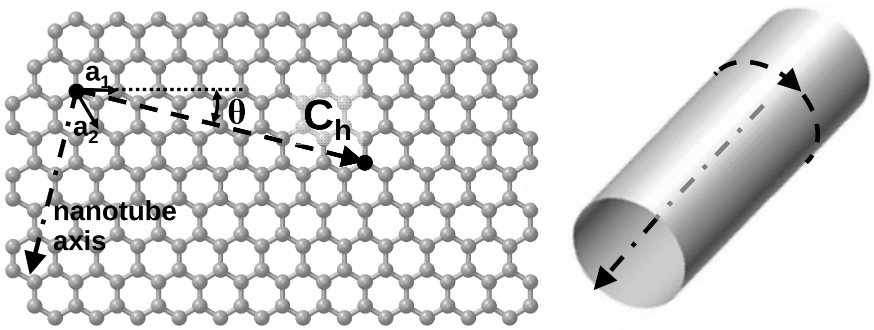

Figure 16: The *chiral vector* C_h defines the wrapping of a *graphene* monolayer to a *nanotube*.

$R = V/I$, given by the ratio of the applied voltage V and the current I. Conductance of one-dimensional structures such as *nanotubes* may differ from that of the related layered substance. Insulating substances such as *boron nitride* yield insulating nanotubes. Metallic or semi-metallic layered substances, including *graphite*, may yield metallic, semi-metallic or semiconducting nanotubes. The conductance of a particular *single-wall nanotube* is dominated by quantization effects that depend on its *chiral index* (n, m). Carbon nanotubes, where $n - m$ is divisible by 3, are metallic or semi-metallic; all other nanotubes are semiconducting. *Armchair nanotubes* with the chiral index (n, n) are truly metallic, *ambipolar* conductors. Within the *ballistic* regime, conductance of metallic or semi-metallic one-dimensional structures is quantized in units of the *conductance quantum* G_0. At small applied voltages, the conductance of metallic single-wall nanotubes is $G = 2G_0$, corresponding to a resistance $R = 1/G \approx 6.5$ kΩ. [More...]

Conductance quantum G_0 is the quantization unit of *conductance* of *nanowires* such as metallic *nanotubes* in the *ballistic* regime. Its value is $G_0 = 2e^2/h \approx (12.9\ \text{k}\Omega)^{-1}$, where e is the electron charge and h is the Planck constant. [More...]

Contacts act as quantum devices on the nanometer scale, often displaying *conductance* quantization or *Coulomb blockade* behavior. Favor-