

# **Clean carbon nanotubes - a perfect model system for quantum nanoelectronics**

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Wrapping a single graphene sheet into a tube with perfect periodic boundary conditions, single wall carbon nanotubes provide an extraordinary electronic model system. By now we can fabricate these structures perfectly clean, and observe electronic quantum states in the unperturbed band structure of the surrounding (semi)conductor. Each carbon nanotube provides as a quantum dot a periodic system of trapped charges on its own, where the observed phenomena range from single particle physics in a potential well to complex many body phenomena. Spin-orbit coupling and valley mixing can be characterized, and connections to the detailed molecular structure can be made.