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Effective Low Energy Lattice Models for Conducting Carbon Nanotubes SEBASTIAN A. REYES, ALEXANDER STRUCK, SEBASTIAN EGGERT, Department of Physics, University of Kaiserslautern, D-67663 Kaiserslautern, Germany — We obtain effective one dimensional lattice theories for the low energy sector of conducting single walled carbon nanotubes. The effective Hamiltonians are obtained by keeping only the conducting bands of the tube, but without taking the a continuum limit. For the zigzag and armchair tubes the theory is particularly simple and reduces to two species of well defined orbitals with only nearest neighbor hopping. These models provide a clear picture of the low energy physics of carbon nanotubes on a lattice without linearization. Correlation functions and density oscillations can be calculated. We show how arbitrary bare electron electron interactions can be included.

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