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Simulation of Transmission Electron Microscopy in Time Domain¹ JIA-AN YAN, Department of Physics, Georgia Southern University, J. DRISCOLL, KALMAN VARGA, S.T. PANTELIDES, Department of Physics, Vanderbilt University — Based on the time-dependent Schrodinger equation, a new method of simulating transmission electron microscope (TEM) images by directly propagating an electron wave packet in real time and real space is presented. Compared to other widely used methods, the new technique yields an accurate description of the electron scattering in solid thin films for both low-energy and the high-energy electrons. We demonstrate the method by simulating TEM images for silicon crystalline films and low-energy-electron diffraction (LEED) images of Si surfaces and graphene. The time-dependent simulations described here could be useful for studying ultrafast electron dynamics in solids.

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