If the specimen is very thin then the electron wave function accumulates a total phase change while passing through the specimen that is just the integral of the potential of the specimen. The incident electrons pass through the specimen and the effect of the specimen is to multiply the incident wave function (5.1)by the specimen transmission function t(x). The wave function transmitted through the specimen is:

and the projected atomic potential is the integral along the optic axis, z of the specimen:

(5.8)

This is the so-called weak phase object approximation (Cowley and Iijima [62]). There are really two assumptions in this approximation. One is that the potential inside the specimen is very small and the other is that the accumulated effect of the specimen can be replaced with a simple integral along z.