

Introduction to quantum electrodynamics
135.045 - (VO 2,0) 2014S

Homework #10 (May 19, 2014)

10.1 Show eq. (5.12):

$$H = \int \frac{d^3k}{(2\pi)^3} |\tilde{\pi}(t, \vec{k})|^2 + \omega_k^2 |\tilde{\varphi}(t, \vec{k})|^2$$

10.2 Calculate (5.18) by inserting (5.13) and (5.14) into (5.10).

$$H = \frac{1}{2} \int d\tilde{k} \omega_k a^\dagger(k) a(k) + a(k) a^\dagger(k) + b^\dagger(k) b(k) + b(k) b^\dagger(k)$$