

(14.1) Fill in the algebra leading to eqn 14.32.

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This is equation (14.32).

$$\hat{H} = \int d^3p \sum_{\lambda=1}^2 E_{\mathbf{p}} \hat{a}_{\mathbf{p}\lambda}^\dagger \hat{a}_{\mathbf{p}\lambda} \quad (14.32)$$

Consider equation (14.28).

$$\mathcal{H} = \frac{1}{2}(\mathbf{E}^2 + \mathbf{B}^2) \quad (14.28)$$

We need to integrate Hamiltonian density  $\mathcal{H}$  to obtain  $\hat{H}$ , that is,

$$\hat{H} = \int d^3x \mathcal{H}$$