

goldstone

$$a_p \equiv \begin{array}{c} p \\ \circ \\ \downarrow \end{array} \quad a_p^\dagger \equiv \begin{array}{c} \circ \\ \uparrow \\ p \end{array} \quad b_a \equiv \begin{array}{c} a \\ \bullet \\ \downarrow \end{array} \quad b_i \equiv \begin{array}{c} i \\ \bullet \\ \downarrow \end{array} \quad b_a^\dagger \equiv \begin{array}{c} \uparrow \\ a \end{array} \quad b_i^\dagger \equiv \begin{array}{c} \downarrow \\ i \end{array} \quad (1)$$

$$a_{q_1 q_2 \cdots q_n}^{p_1 p_2 \cdots p_n} \equiv \begin{array}{c} p_1 \quad p_2 \quad \cdots \quad p_n \\ \uparrow \quad \uparrow \quad \cdots \quad \uparrow \\ \bigcirc \text{---} \bigcirc \text{---} \cdots \text{---} \bigcirc \\ \uparrow \quad \uparrow \quad \cdots \quad \uparrow \\ q_1 \quad q_2 \quad \cdots \quad q_n \end{array} \quad \tilde{a}_{q_1 q_2 \cdots q_n}^{p_1 p_2 \cdots p_n} \equiv \begin{array}{c} p_1 \quad p_2 \quad \cdots \quad p_n \\ \uparrow \quad \uparrow \quad \cdots \quad \uparrow \\ \bigodot \text{---} \bigodot \text{---} \cdots \text{---} \bigodot \\ \uparrow \quad \uparrow \quad \cdots \quad \uparrow \\ q_1 \quad q_2 \quad \cdots \quad q_n \end{array} \quad (2)$$

$$\left(\frac{1}{n!}\right)^2 v_{p_1 p_2 \dots p_n}^{q_1 q_2 \dots q_n} \tilde{a}_{q_1 q_2 \dots q_n}^{p_1 p_2 \dots p_n} \equiv \boxed{v} \begin{array}{c} \uparrow \\ \downarrow \end{array} \begin{array}{c} \uparrow \\ \downarrow \end{array} \dots \begin{array}{c} \uparrow \\ \downarrow \end{array} \quad (3)$$

$$h_p^q a_q^p \equiv \text{diagram} \quad (4)$$

$$\text{Diagram 1} = \text{Diagram 2} + \text{Diagram 3} \quad (5)$$

$$\text{Diagram 1} = \text{Diagram 2} + \text{Diagram 3} + \text{Diagram 4} + \text{Diagram 5} + \text{Diagram 6} \quad (6)$$

$$\frac{1}{4}\bar{g}_{pq}a_{rs}^{pq} = \text{diagram of a wavy line between two vertical lines} \quad (7)$$

$$\begin{array}{c} \text{---} \bigcirc \text{---} \end{array} = \begin{array}{c} \text{---} \bigcirc \text{---} \end{array} + \begin{array}{c} \text{---} \bigcirc \text{---} \end{array} + \begin{array}{c} \text{---} \bigcirc \text{---} \end{array} + \begin{array}{c} \text{---} \bigcirc \text{---} \end{array} \quad (8)$$

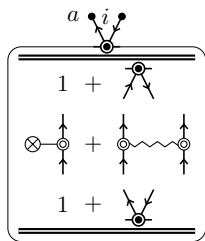
$$\text{Diagram 1} = \text{Diagram 2} + \text{Diagram 3} + \text{Diagram 4} + \text{Diagram 5} + \text{Diagram 6} + \text{Diagram 7} + \text{Diagram 8} + \text{Diagram 9} + \text{Diagram 10} + \text{Diagram 11} \quad (9)$$

$$\begin{array}{c} \square \\ \downarrow \end{array} + \begin{array}{c} \text{---} \text{---} \text{---} \\ \downarrow \end{array} = E_0 + \begin{array}{c} \otimes \\ \downarrow \end{array} + \begin{array}{c} \odot \\ \downarrow \end{array} \quad E_0 \equiv \begin{array}{c} \square \text{---} \odot \end{array} + \begin{array}{c} \odot \text{---} \text{---} \odot \end{array} \quad \begin{array}{c} \otimes \\ \downarrow \end{array} \equiv \begin{array}{c} \square \\ \downarrow \end{array} + \begin{array}{c} \odot \text{---} \text{---} \odot \\ \downarrow \end{array} \quad (10)$$

$$\begin{aligned}
& \overline{\overline{1 + \text{diagram}}} \\
& \otimes \text{diagram} + \text{diagram} = \text{diagram} + \text{diagram} + \text{diagram} + \text{diagram} + \text{diagram} \\
& \overline{\overline{1 + \text{diagram}}}
\end{aligned} \tag{11}$$

$$E_c = \frac{\text{Diagram 1} + \text{Diagram 2}}{\text{Diagram 3}} = \text{Diagram 4} \quad (12)$$

[illegible]



(14)