

goldstone

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

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

$$\left(\frac{1}{n!}\right)^2 v_{p_1 p_2 \dots p_n}^{q_1 q_2 \dots q_n} \tilde{a}_{q_1 q_2 \dots q_n}^{p_1 p_2 \dots p_n} \equiv \text{Diagram (3)} \quad (3)$$

$$h_p^q a_q^p \equiv \begin{array}{c} \uparrow \\ \boxed{\times} - \bigcirc \\ \downarrow \end{array} \quad (4)$$

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

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

$$\frac{1}{4} \bar{g}_{pq}^{rs} a_{rs}^{pq} = \text{diagram of a wavy line with four external legs} \quad (7)$$

$$\text{Diagram 1} = \text{Diagram 2} + \text{Diagram 3} + \text{Diagram 4} + \text{Diagram 5} \quad (8)$$

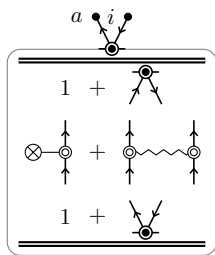
[illegible]

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

$$\begin{aligned}
& 1 + \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]} \\
& \otimes \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]} + \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]} \\
& 1 + \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]} \\
& = \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]} + \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]} \\
& + \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]} + \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]} + \text{[Diagram: a circle with a cross inside, two incoming lines from the left, and two outgoing lines to the right]}
\end{aligned} \quad (11)$$

$$\begin{array}{c}
\text{---} \otimes \text{---} + \text{---} \text{---} \text{---} \\
\text{exp} \left(\text{---} \text{---} \text{---} \right) = \text{---} \text{---} \text{---}
\end{array} \quad (12)$$

$$\begin{aligned}
& \overline{\overline{a \downarrow i \downarrow b \downarrow j \downarrow}} \\
& \otimes \left(\downarrow \downarrow + \downarrow \downarrow \downarrow \downarrow \right) = \\
& \exp \left(\downarrow \downarrow \downarrow \downarrow \right) \\
& \overline{\overline{}} \\
& + \\
& + \\
& +
\end{aligned}
\tag{13}$$



(14)



(15)