

$$A(i) \sum_{P \in S} (\pm 1)^P T_P \{ \psi_{\nu_1}(1) \dots \psi_{\nu_N}(N) \}$$

$$= \sum_{P \in S} (\pm 1)^P T_P \{ \psi_{\nu_1}(1) \dots A(i) \psi_{\nu_i}(i) \dots \psi_{\nu_N}(N) \}$$

$$A(i) \psi_{\nu_i}(i) = \sum_{\lambda=1}^{\infty} \psi_{\lambda}(i) A_{\lambda i} \text{ mit } A_{\lambda i} = \langle \psi_{\lambda} | A | \psi_i \rangle$$

$$1) \lambda = i \iff A_{\lambda\lambda} \text{ und } |n_1 n_2 \dots n_{\nu_i} \dots \rangle$$

$$2) \lambda \neq i \iff A_{\lambda i} \text{ und } |n_1 n_2 \dots n_{\lambda+1} \dots n_i - 1 \dots \rangle$$

$$a_{\lambda}^{\dagger} a_{\mu} |n_1 n_2 \dots \rangle = \sqrt{n_{\lambda}+1} \sqrt{n_{\mu}} |n_1 n_2 \dots \dots n_{\lambda+1} \dots n_{\mu}-1 \dots \rangle$$

$$a_{\lambda}^{\dagger} a_{\lambda} |n_1 n_2 \dots \rangle = n_{\lambda} |n_1 n_2 \dots \rangle$$

$$a_{\lambda} a_{\lambda}^{\dagger} |n_1 n_2 \dots \rangle = (n_{\lambda}+1) |n_1 n_2 \dots \rangle$$

$$\text{Vertauschungsrelation } [a_{\lambda}, a_{\lambda}^{\dagger}] = 1$$

$$\text{VR } [a_{\lambda}, a_{\mu}^{\dagger}] = \delta_{\lambda\mu} 1$$

$$[a_{\lambda}, a_{\mu}] = 0 = [a_{\lambda}^{\dagger}, a_{\mu}^{\dagger}]$$

$$\langle 10 \dots 110 \dots \rangle = \langle a_i^{\dagger} 10 \rangle | a_i^{\dagger} 10 \rangle$$

$$|10\dots\rangle = a_1^+ |0\rangle \quad \Bigg| \quad = \langle 0 | a_1 a_1^+ |0\rangle = \langle 0 | 0 \rangle$$

$$a_1^+ |0\rangle = |10\dots\rangle$$

$$a_1 a_1^+ |0\rangle = |0\rangle$$

Annahme: Vakuum-Vektor  
ist normiert

$$\langle 0 | 0 \rangle$$