

$$\langle \bar{\Phi}_0 | [a_i^\dagger a_m, a_\mu^\dagger a_{\mu'}] | \bar{\Phi}_0 \rangle = \langle \bar{\Phi}_0 | a_i^\dagger a_m a_\mu^\dagger a_{\mu'} | \bar{\Phi}_0 \rangle - \langle \bar{\Phi}_0 | a_\mu^\dagger a_{\mu'} a_i^\dagger a_m | \bar{\Phi}_0 \rangle \quad 5$$

$\downarrow$
 $\delta_{m\mu} \delta_{i\mu'}$

$$\langle \bar{\Phi}_0 | [a_m^\dagger a_i, a_\mu^\dagger a_{\mu'}] | \bar{\Phi}_0 \rangle = \langle \bar{\Phi}_0 | a_m^\dagger a_i a_\mu^\dagger a_{\mu'} | \bar{\Phi}_0 \rangle - \langle \bar{\Phi}_0 | a_\mu^\dagger a_{\mu'} a_m^\dagger a_i | \bar{\Phi}_0 \rangle \quad 6$$

$\downarrow$
 $\delta_{\mu\mu'} \delta_{im}$

Unendo il tutto

$$\begin{aligned} \langle i | F | \Phi_0^v \rangle &= \sum_{m, \mu, \mu'} f_{\mu\mu'} \left(\chi_{mi}^\nu \delta_{m\mu} \delta_{i\mu'} + \gamma_{mi}^\nu \delta_{m\mu'} \delta_{i\mu} \right) = \\ &= \sum_{m, i} \left[\chi_{mi}^\nu \langle m | F | i \rangle + \gamma_{mi}^\nu \langle i | F | m \rangle \right] \end{aligned} \quad 6$$