$$\int d\vec{p}\, \left|\langle \Psi_n^{N-1} | a_{\vec{p}} | \Psi_0^N \rangle\right|^2$$

$a_{\vec{p}} |\Psi_0^N\rangle$

$$\sum_n \langle \Psi_0^N | a_{\vec{p}}^\dagger | \Psi_n^{N-1}\rangle \langle \Psi_n^{N-1} | a_{\vec{p}} | \Psi_0^N \rangle$$

$\vec{k}\cdot\vec{s} = q^2 - k^2 - s^2$

$\vec{q} = \vec{k} + \vec{s}$

$$1 = \sum_n |\Psi_{A-1}^n\rangle\langle \Psi_{A-1}^n|$$

$(e, e'p)$ at ... T_i

spin-orbit splitting

$1p_{1/2}$

$1p^3/_2$

$1s_{1/2}$

$\rho_{1\text{-body}}(\vec{r}, \vec{r}')$

$$n(\vec{q}) = \langle a_q^\dagger a_q \rangle$$

$$= \int d^3r \int d^3r' \langle \Psi_A | \hat{\psi}^\dagger(\vec{r}')\, \hat{\psi}(\vec{r}) | \Psi_A \rangle e^{-i\vec{q}\cdot(\vec{r}-\vec{r}')}$$

$$= \langle \Psi_A | \left[\int d^3r'\, e^{i\vec{q}\cdot\vec{r}'} \hat{\psi}^\dagger(\vec{r}')\right]\left[\int d^3r\, e^{-i\vec{q}\cdot\vec{r}} \hat{\psi}(\vec{r})\right] | \Psi_A \rangle$$

$$\hat{\psi}(\vec{r}) = \sum_\alpha \phi_\alpha(\vec{r})\, a_\alpha$$

$$\hat{\psi}^\dagger(\vec{r}') = \sum_{\alpha'} \phi_{\alpha'}^*(\vec{r}')\, a_{\alpha'}^\dagger$$

$$\langle \Psi_A | a_{\alpha'}^\dagger a_\alpha | \Psi_A \rangle$$

$\delta_{\alpha\alpha'}$

$$\sum_\alpha \phi_\alpha^*(\vec{q})\, \phi_\alpha(\vec{q})$$

$\frac{3}{z}\left(\frac{\sin z}{z^2} - \frac{\cos z}{z}\right)$

$\vec{R} = \frac{\vec{r}+\vec{r}'}{2}$

$\vec{s} = \vec{r}' - \vec{r}$

$$\int d^3R \int d^3s\, \rho^A(\vec{R}, \vec{s})\, e^{i\vec{k}\cdot\vec{s}}$$

$$\rho(\vec{R}, \vec{s}) = \rho(R)\, \rho_{SL}(s k_F(R)) + \ldots \qquad \rho_{SL}(z) = \frac{3}{z} j_1(z)$$

$$k_F(R) = \frac{\nu}{6\pi^2} k_F^3(R)$$

$e^{i\vec{k}\cdot\vec{s}} \rightarrow j_0(sk)$

$$\nu \int dR\, \theta(k_F(R) - k)$$