$$\rho(r) = \rho_0(r)\left[1 + \epsilon(\vec{r})\right]$$

$$F_0(Q) \overset{FT}{\longleftrightarrow} \rho_0(\vec{r})$$

$$A(Q) \longleftrightarrow \epsilon(\vec{r})$$

$$F(Q) = F_0(Q) + F_0(Q) \otimes A(Q)$$

$$F_0 \otimes A = \int d^3Q' \, A(Q') \, F_0(Q - Q')$$

$$\epsilon(r) = \int e^{iq \cdot r} A(q) \, d^3q$$

$$\rho(r) = \int e^{iq \cdot r} F_0(q) \, d^3q$$

$$\epsilon(r)\rho(r) = \int d^3q \, d^3q' \, e^{iq \cdot r} e^{iq' \cdot r} A(q) F_0(q')$$

$$\epsilon(r)\,\rho(r) = \int d^3q\, d^3q'\, e^{iq\cdot r}\, e^{iq'\cdot r}\, A(q)\, F_0(q')$$

$$q + q' = q_0$$

$$= \int d^3q_0\, e^{iq_0\cdot r} \left[\int d^3q\, A(q)\, F_0(q_0 - q) \right]$$

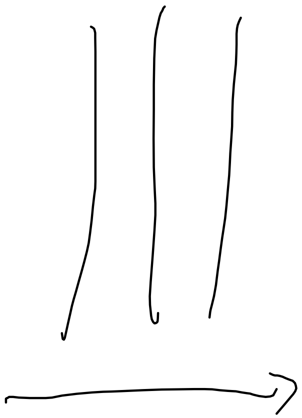
$$\epsilon(r)\,\rho(r) \xrightarrow{F.T.} A(q)\, F(q_0 - q)$$

$$\bar{a}(\vec{r}) = a_0 \cos(\vec{K}\cdot\vec{r})$$

$$F(q) = \frac{a_0}{2}\left(\delta(a - K) + \delta(a + K)\right)$$

[illegible]

$r_i(t)$ Scattering from a collection of moving nuclei



$e^{i(k_0 \cdot r - \omega_0 t)}$

$R_i(t)$

$$e^{i\left[k_2|\vec r-\vec R_i(t_i)|-w_2(t-t_i)\right]}$$

$$|\vec r-R_i(t_i)|$$

$$\frac{q_i}{|r-\cancel{R_i}(t_i)|}$$

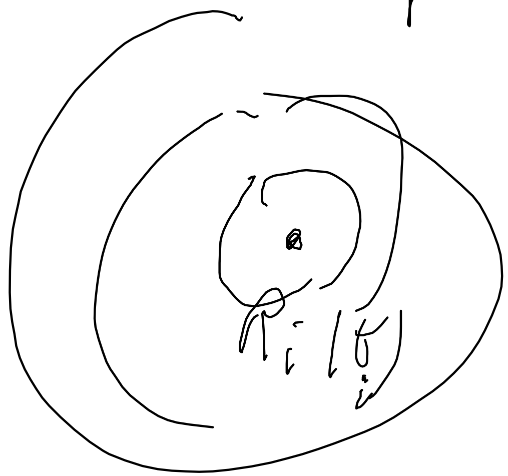
$$e^{i(k_1\cdot R_i(t_i)-w_1 t_i)}$$

$$\frac{q_i}{r}e^{i(k_2 r-w_2 t)}$$

$$\frac{e^{i(kr-wt)}}{r}$$

Spherical wave from O

Spherical wave from $\vec R_i(t)$



$$\frac{a_i}{\left(r - \cancel{R_i}(t_i)\right)}\, e^{i\left[k_2\left|\vec{r} - \vec{R}_i(t_i)\right| - w_2(t - t_i)\right]} \times e^{i\left(k_1 \cdot R_i(t_i) - w_1 t_i\right)}$$

$$\left(\frac{a_i}{r}\right) e^{i(k_2 r - w_2 t)}\left(e^{-i\vec{k}_2 \cdot \vec{R}_i(t) + i(w_2 - w_1)t_i + i k_1 \cdot R_i(t_i)}\right]$$

$$\sum_i \frac{a_i}{r} e^{i(k_2 r - w_2 t)}\left[e^{i\left[Q \cdot R_i(t_i) + \Delta w\, t_i\right]}\right]$$

$$\sum_{i,j} (a_i\, a_j)\, e^{iQ \cdot (R_i - R_j) + \Delta w_{t_i - t_j}}$$

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