General Physics Notes (0902026):

Plane waves are found.

$$E_k = \frac{\hbar^2 k^2}{2\mu} \tag{1}$$

We want to know Green's function scattering for plane waves (quantum particle waves).

$$G(r, r', E) = \left(\frac{1}{2\pi}\right)^3 \frac{2\mu}{\hbar^2} \int_0^\infty k^2 \partial k \int_0^{2\pi} \partial\phi \int_0^\pi \frac{\sin\theta \partial\theta e^{i \cdot ks \cos\theta}}{K^2 - k^2} \tag{2}$$

These are some pretty nasty integrals and they ignore the zeta turbulence or the zeta calculus. I'll spare you the integration and just give you the results. You can look at my handwritten notes if you are interested.

$$\int \partial^3 \vec{r'} \langle \vec{k} | \vec{r} \rangle \langle \vec{r'} | W | \vec{k}; + \rangle = \left(\frac{1}{2\pi}\right)^{\frac{3}{2}} e^{i\vec{k}\cdot\vec{r}} \left(-\frac{\mu}{2\pi\hbar^2}\right) \frac{2\pi^{\frac{3}{2}} e^{i\vec{k}\cdot\vec{r}}}{r} \langle \vec{k} | W | \vec{k}; + \rangle \tag{3}$$

Basically we have these equations that tell us initial and final states along the azimuth of observation. What is happening is an interaction of Green's function field with particle momenta along the easy $\vec{k}$ axis. If you want to imagine the interaction then think of the structure of the fields as aligned with their propagation vector and interacting with that propagation vector direction. This is the simple way of thinking about basic interaction. I think it is a nearest neighbor approximation.

If you want to try to do these integrals, get in touch and I'll scan and send you my handwritten notes.