General Physics Notes (08282026):

I have not had too much time to type the notes. Scattering is critical for understanding the motion of particles after elastic and inelastic collisions. It is so important that Paul Dirac invented a new type of notation just to describe the infinitesimal quantum scattering. Confluent hyper-geometries and exact solutions from a Coulomb and then Yukawa potential.

$$V(r) = \frac{-Z_{eff}e^2}{r} \tag{1}$$

This is the traditional field that generates the inverse square force relation. Of course, it comes from symmetry. New calculus will involve an inflationary and punctuated equilibrium model of prime turbulence. Yukawa follows.

$$V(r) = \frac{-\lambda}{r}e^{\frac{r}{R}} \tag{2}$$

After some manipulation we generate a form.

$$\xi\frac{\partial^2 F\xi}{\partial\xi^2} + (1 - ik\xi)\frac{\partial F}{\partial\xi} + \gamma kF = 0 \tag{3}$$

We get this expression from $\xi = r - z$ not the effective charge but the azimuth. These are geometric constraints.

$$F(\xi) = C_1F_1(i\gamma, 1, ik\xi) \tag{4}$$

Here C_1 is a constant and again this is hyper-geometric function.

$$F(\xi) \quad \xi \to \infty \quad e^{ikz}F(\xi) \tag{5}$$

We want to find the scattering amplitude.

$$\frac{\Gamma(1 - i\gamma)}{i\Gamma(i\gamma)} = -\gamma e^{i\pi + 2i\eta_0}(6)$$

Here $\eta_0 = arg(\Gamma(1 - i\gamma)$ and we want to find angular dependence.

$$f(\theta) = \frac{-\gamma}{2k\sin^2(\frac{1}{2\theta})}e^{i\gamma\ln(\sin^2\frac{\theta}{2}) + i\pi + 2i\eta_0}(7)$$

This is the scattering amplitude. If you are curious about some more of these details, then I would approach them like this...

$$f(\theta) \otimes SU(n) = M_{n\times n}(\theta, \xi) \tag{8}$$

Here we are involving a complex system with a structural Yang-Mills representation in the scattering of states. All points have the Yang-Mills basis and need to expand from there.

$$f(\theta) \otimes SU(n)\zeta(s, t) = Nr^D M_{n\times n}(\theta, \xi)\zeta(\xi, t) \tag{9}$$

What we are doing is involving some zeta correction with the metadata and reducing its dimension and correcting it to a deterministic fractal. This is the Nr^D term. We are relly tryig to brute force the equation to lower dimensionality and linearization eventually.