87(1): Amplification of the Lamb Shift by SCR.

Starting with the definition of the electric field in paper 63:

$$\underline{E} = -(\underline{\nabla} + \underline{\omega})\phi \quad -(1)$$

and:

$$\underline{\nabla} \cdot \underline{E} = \rho / \epsilon_0 \quad -(2)$$

with a spin connection of the type:

$$\omega_r = -\frac{1}{r} \quad -(3)$$

we obtain:

$$\frac{\partial^2 \phi}{\partial r^2} + \frac{1}{r}\frac{\partial \phi}{\partial r} - \frac{1}{r^2}\phi = -\rho/\epsilon_0 \quad -(4)$$

This gives spin connection resonance with

$$\rho = \rho(0)\cos(\kappa_r r). \quad -(5)$$

The potential energy is:

$$V = -e\phi \quad -(6)$$

and so the Schrödinger equation for H is:

$$-\frac{\hbar^2}{2m}\nabla^2\psi = (E + e\phi)\psi \quad -(7)$$

with: $$\Lambda Y = -\ell(\ell+1)Y \quad -(8)$$

and $$\phi = R(r)Y(\theta, \phi) \quad -(9)$$

Therefore eq. (7) must be solved for the Lamb shift using ϕ from eqs. (4) and (5)

- Eq. (7) is written as:

$$-\frac{\hbar^2}{2m}\frac{d^2P}{dr^2} - V_{eff}^{(0)}P = EP \quad -(10)$$

where: $$V_{eff}^{(0)} = e\phi - \frac{\ell(\ell+1)\hbar^2}{2mr^2} \quad -(11)$$

- The radiative correction is already incorporated in this method because ϕ is calculated from the spin connection of spacetime. So the above method is assumed to be equivalent to:

$$-\frac{\hbar^2}{2m}\left(1+\frac{\alpha}{4\pi}\right)^2\frac{d^2P}{dr^2} - V_{eff}^{(0)}P = EP, \quad -(12)$$

i.e. to $$-\frac{\hbar^2}{2m}\frac{d^2P}{dr^2} - V_{eff}P = EP \quad -(13)$$

i.e.

$$-\frac{\hbar^2}{4\pi m}\,\alpha\,\frac{d^2 P}{dr^2} = \left(V_{eff}^{(0)} - V_{eff}\right) P \quad \text{— (14)}$$

where:

$$V_{eff} = \frac{e^2}{4\pi\epsilon_0\left(r + r(vac)\right)} - \frac{l(l+1)\hbar^2}{2m\left(r + r(vac)\right)^2} \quad \text{— (15)}$$

Comparing eqs. (11) and (15):

$$\boxed{e\phi - \frac{l(l+1)\hbar^2}{2m}\left(\frac{1}{r^2} - \frac{1}{\left(r + r(vac)\right)^2}\right) = \frac{e^2}{4\pi\epsilon_0\left(r + r(vac)\right)}} \quad \text{— (16)}$$

So $r(vac)$ can be expressed in terms of ϕ, and when ϕ resonates, so does $r(vac)$.