**Answer on Question #63816-Physics-Other**

Show that any solution of the Dirac equation is also a solution of the Klein-Gordon (KG) equation.

**Solution**

Let $\psi$ is a solution of the Dirac equation:

$$\left(-\gamma^0 p^0 + \gamma^j p^j + mc\right)\psi(x) = 0$$

Multiply this equation by $\left(\gamma^0 p^0 - \gamma^j p^j + mc\right)$:

$$\left(\gamma^0 p^0 - \gamma^j p^j + mc\right)\left(-\gamma^0 p^0 + \gamma^j p^j + mc\right)\psi(x) = 0$$

$$((\vec{p})^2 - (p^0)^2 + m^2c^2)\psi(x) = 0, \qquad where\ \ p^0 = \frac{E}{c}$$

Therefore, $\psi$ is a solution of the Klein-Gordon equation.