Elementary Particles II   Problem Set #6   due 2/1/03

Neutrinos

1. Prove that the neutrino bilinears

$$\nu^{aT}(x)\sigma^2\nu^b(x) \quad \text{and} \quad \nu^{aT}(x)\sigma^2\vec{\sigma}\nu^b(x)$$

transform, respectively, like $(0,0)$ and $(1,0)$ representations of the Lorentz group.

2. Given

$$-\mathcal{L}_{Z^0} = \frac{g}{2\cos\theta_W}\overline{\nu_{Li}}\gamma^\mu\nu_{Li}Z^0_\mu,$$

calculate the decay width $\Gamma(Z \to \overline{\nu_{Li}}\nu_{Li})$.