Recitation #12
Quantum 522

---

1. For the $E > 0$ solutions of the Dirac equation, take $u_A = \chi^1$ and show that in the non-relativistic limit u_B is smaller than u_A by a factor of v/c.

$$\vec{\sigma} \cdot \vec{p} u_B = (E - m) u_A$$
$$\vec{\sigma} \cdot \vec{p} u_A = (E + m) u_B$$

2. We have the Dirac spinor equation

$$(\gamma^\mu p_u - m)\, u(\vec{p}) = 0$$

Find the corresponding equation for the Dirac conjugate $\bar{u} = u^\dagger \gamma^0$

Recall $(\gamma^k)^\dagger = -\gamma^k$ and $(\gamma^0)^\dagger = \gamma^0$