

Phys. 804  
HW assignment 12.

**Problem**

In CEBAF accelerator at JLab, the electrons with energy  $E = 6\text{GeV}$  scatter from the proton target which is at rest. Is it possible to produce charmed particles in CEBAF accelerator? What about the upgraded CEBAF with the electron energy  $12\text{ GeV}$ ? The lightest charmed particle ( $J/\psi$ ) has a rest mass  $3.1\text{ GeV}$ . Hint: When we have barely enough energy, the electron, the proton and the produced ( $J/\psi$ ) particle have negligible relative velocities in the final state.