

Phys. 804 — Classical Electrodynamics

HW Assignment 11

Due Tue April 25.

**Problem 1**

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 GeV?

The lightest charmed particle ( $J/\Psi$ ) has a rest mass 3.1 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.