AY 7B Assignment 2

due: Friday, February 10

Problem 1: An atom of rest mass $M_\circ$ emits of photon of energy Q and thereby recoils in the opposite direction at speed v. Call its new rest mass, following emission of the photon, $M'_\circ$,

(a) Find $\beta \equiv v/c$ and $M'_\circ/M_\circ$, both in terms of $q \equiv Q/(M_\circ c^2)$.

If the atom had not recoiled, the emitted photon would have had energy

$$Q_\circ = (M_\circ - M'_\circ)\, c^2 \ .$$

In fact, $Q < Q_\circ$ because of the recoil.

(b) What is $Q/Q_\circ$, again expressed in terms of q?

Problem 2: C & O, Problem 17.16

Problem 3: C & O, Problem 17.24

Problem 4: C & O, Problem 18.2

Problem 5: C & O, Problem 18.4

Problem 6: C & O, Problem 28.3

Problem 7: C & O, Problem 28.11