PHYSICS 200C, SPRING 2017
ELECTRICITY AND MAGNETISM

Assignment Five (part B), Due Friday, June 2, 5:00 pm.

[1.] In a pair annihilation experiment, an electron of mass m_e and momentum p_e hits a positron at rest. The annihilate, producing two photons. If one photon emerges at an angle of 60° relative to the incoming electron momentum, what is its energy?

[2.] Using the transformation laws for $\vec{\mathbf{E}}$ and $\vec{\mathbf{B}}$, verify $E^2 - c^2B^2$ and $\vec{\mathbf{E}} \cdot \vec{\mathbf{B}}$ are Lorentz invariant.

[3.] Suppose the field is purely electric (i.e. $\vec{\mathbf{B}} = 0$) in some Frame S. Show that the fields in a Frame S′ with velocity along $\vec{\mathbf{E}}$ are the same as in S.