

SET 11–DUE 10 APRIL

I'll be out of town Monday through Wednesday, and we'll have two guest lecturers talking about the motion of charged particles in E and B fields. So let's put this homework off till the Friday.

“The secret to creativity is knowing how to hide your sources.” – A. Einstein

1) [20 points] Jackson 12.6. Instead of part (a), show that a Lorentz transformation can be made, to go to a frame where \vec{B}' and \vec{E}' are parallel, and that the boost velocity satisfies the equation

$$\frac{\vec{\beta}}{1 + \beta^2} = \frac{\vec{E} \times \vec{B}}{E^2 + B^2}$$

In part (b), note the phrase “with appropriate constants of motion.”

2) [20 points] Jackson 12.3. In part (b) I obtained

$$\frac{eE_0x}{\gamma_0 mc^2} = \cosh\left(\frac{eE_0y}{\gamma_0 v_0 mc}\right) - 1$$