Do you see a problem do you see with $\mathbf{F} = \frac{d\mathbf{p}}{dt}$ with regard to relativity? We still define $\mathbf{p} \equiv \gamma m \mathbf{v}$.

A. There's no problem at all
B. Yup there's a problem, and I know what it is.
C. There's probably a problem, but I don't know what it is.

Can we define a 4-force via the 4-momentum?

$$\frac{dp^\mu}{d\tau} = K^\mu$$

Is K^μ, so defined, a 4-vector?

A. Yes, and I can say why.
B. No, and I can say why.
C. None of the above.

To match the behavior of non-relativistic classical mechanics, we might tentatively assign which of the following values to $\mathbf{K} = K^{1,2,3}$:

A. $\mathbf{K} = \mathbf{F}$
B. $\mathbf{K} = \mathbf{F}/\gamma$
C. $\mathbf{K} = \gamma\mathbf{F}$
D. Something else

A charge q is moving with velocity $\mathbf{u}$ in a uniform magnetic field $\mathbf{B}$.

$$\mathbf{F} = q\mathbf{u} \times \mathbf{B} = m\mathbf{a}$$

If we switch to a different Galilean frame (a low speed Lorentz transform), is the acceleration $\mathbf{a}$ different?

A. Yes

B. No

A charge q is moving with velocity $\mathbf{u}$ in a uniform magnetic field $\mathbf{B}$.

$$\mathbf{F} = q\mathbf{u} \times \mathbf{B} = m\mathbf{a}$$

If we switch to a different Galilean frame (a low speed Lorentz transform), is the particle velocity $\mathbf{u}$ different?

A. Yes
B. No

A charge q is moving with velocity $\mathbf{u}$ in a uniform magnetic field $\mathbf{B}$.

$$\mathbf{F} = q\mathbf{u} \times \mathbf{B} = m\mathbf{a}$$

If we switch to a different Galilean frame (a low speed Lorentz transform), is the magnetic field $\mathbf{B}$ different?

A. Yes
B. No

A charge q is moving with velocity $\mathbf{u}$ in a uniform magnetic field $\mathbf{B}$.

$$\mathbf{F} = q\mathbf{u} \times \mathbf{B} = m\mathbf{a}$$

Suppose we switch to frame with $\mathbf{v} = \mathbf{u}$, so that in the primed frame, $\mathbf{u}' = 0$ (the particle is instantaneously at rest). Does the particle feel a force from an E-field in this frame?

A. Yes
B. No
C. depends on details