

Set 11. Exercises for 3. November 2017

Problem 63: Prove eq. (7.9) in *Goldstein* from eq. (7.8). [Hint: Consider the transformation of \mathbf{r} along and perpendicular to $\boldsymbol{\beta}$ separately.]

Problem 64: An unstable elementary particle with lifetime τ is moving in a circular accelerator tube of radius a with angular velocity ω . What is the lifetime of the particle measured in the laboratory?

Problem 65: *Goldstein*, exercise 7.17.

Problem 66: *Goldstein*, exercise 7.24.

Problem 67: *Goldstein*, exercise 7.14. Explain why the answer is *not* given by just the Lorentz contraction.

Problem 68: *Goldstein*, exercise 7.23. [Hint. See the solution for the non-relativistic version in problem 12.]

Problem 69: Exam problem 2, 2016 spring.