

CHAPTER OVERVIEW

9: Special Relativity

This chapter starts with a review of special relativity's basics, including the very convenient 4-vector formalism. This background is then used for the analysis of the relation between the electromagnetic field's values measured in different inertial reference frames moving relative to each other. The results of this discussion enable the analysis of relativistic particle dynamics in the electric and magnetic fields, and of the analytical mechanics of the particles – and of the electromagnetic field as such.

- [9.1: Einstein Postulates and the Lorentz Transform](#)
- [9.2: Relativistic Kinematic Effects](#)
- [9.3: 4-vectors, Momentum, Mass, and Energy](#)
- [9.4: More on 4-vectors and 4-tensors](#)
- [9.5: The Maxwell Equations in the 4-form](#)
- [9.6: Relativistic Particles in Electric and Magnetic Fields](#)
- [9.7: Analytical Mechanics of Charged Particles](#)
- [9.8: Analytical Mechanics of Electromagnetic Field](#)
- [9.9: Exercise Problems](#)

Thumbnail: Illustration of a light cone. (Public Domain; [Incnis Mrsi](#) via [Wikipedia](#))

This page titled [9: Special Relativity](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Konstantin K. Likharev](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform.