Part II Objectives

This part addresses two major groups of questions:

- whether the consequences of special relativity and the experiments that confirm them are possible if the world is three-dimensional,
- whether the different types of argument against the reality of space-time are valid.

Chapter 5 analyzes four kinematic consequences of special relativity – relativity of simultaneity, length contraction, time dilation, and the twin paradox – by explicitly taking into account the existence and dimensionality of the physical objects involved in these relativistic effects. It is argued that none of these effects would be possible if the world were three-dimensional. The chapter discusses the implications of this result for a number of fundamental issues such as conventionality of simultaneity, change, passage, temporal becoming, flow of time, and free will, which look completely different in three-dimensional and four-dimensional worlds.

Chapter 6 deals with a group of arguments essentially claiming that what the analysis of the consequences of special relativity is telling us may be valid in the case of this theory, but the analysis of other theories may arrive at different conclusions. It is shown that such arguments are invalid since the analyses of different theories are ultimately based on the experimental evidence that supports them and experimental results cannot contradict one another.

Chapter 7 addresses another group of more general arguments which question the reliability of scientific knowledge. The aim of these arguments is to ignore any unpleasant conclusions drawn from the analysis of the consequences of special relativity (and any other theory) by claiming that any theory will one day be replaced by another more adequate theory which may have a different (more pleasant) interpretation. These arguments imply that, in the case of special relativity, the future theory that will replace it may not lead to the view that the world is four-dimensional. It is argued in this chapter that a tested scientific theory will never be proven wrong in its area of applicability, where its predictions have been experimentally confirmed.