

Theory of Relativity

**Albert Einstein, Austrian physicist, from his book,
Relativity, The Special and General Principles, 1916**

The basal principle, which was the pivot of all our previous considerations, was the special principle of relativity, i.e. the principle of the physical relativity of all uniform motion. It was at all times clear that, from the point of view of the idea it conveys to us, every motion must be considered only as a relative motion. Returning to the illustration we have frequently used of the embankment and the railway carriage, we can express the fact of the motion here taking place in the following two forms, both of which are equally justifiable:

- (a) The carriage is in motion relative to the embankment,
- (b) The embankment is in motion relative to the carriage.

In (a) the embankment, in (b) the carriage, serves as the body of reference in our statement of the motion taking place. If it is simply a question of detecting or of describing the motion involved, it is in principle immaterial to what reference-body we refer the motion. As already mentioned, this is self-evident, but it must not be confused with the much more comprehensive statement called "the principle of relativity," which we have taken as the basis of our investigations. The principle we have made use of not only maintains that we may equally well choose the carriage or the embankment as our reference-body for the description of any event (for this, too, is self-evident). Our principle rather asserts what follows: If we formulate the general laws of nature as they are obtained from experience, by making use of (a) the embankment as reference-body or (b) the railway carriage as reference-body, then these general laws of nature (e.g. the laws of mechanics or the law of the propagation of light in vacuo) have exactly the same form in both cases. This can also be expressed as follows: For the physical description of natural processes, neither of the reference bodies is unique (literally "specially marked out ") as compared with the other. Unlike the first, this latter statement need not of necessity hold a priori; it is not contained in the conceptions of "motion" and "reference-body" and derivable from them; only experience can decide as to its correctness or incorrectness.

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