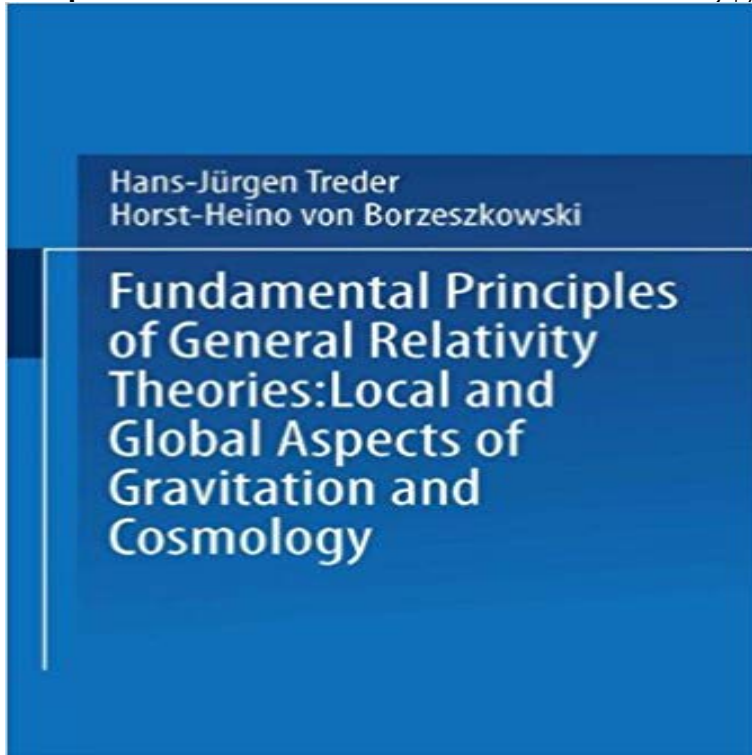


Fundamental Principles of General Relativity Theories: Local and Global Aspects of Gravitation and Cosmology



The present monograph is not a self-contained introductory text. Instead it presupposes to a large extent that the reader is not only thoroughly familiar with the special theory of relativity, but that he or she has studied the standard aspects of the general theory, as well. Starting from local and global formulations of the principles of inertia and relativity, we discuss the microscopic and telescopic aspects of gravitation. Our central goal has been to demonstrate that the foundations of gravitational theory laid by Newton and Einstein imply questions on the relation between the micro- and macrocosm. The discussions surrounding these physical points can be rather well understood without an elaborate mathematical formalism. All the same, we have attempted to make the main theme of our presentation accessible also to readers outside the circle of pundits by including two appendixes of a largely instructional nature. Appendix A gives a brief review of the basic concepts of four-dimensional spaces, for the convenience of readers who need a recapitulation, while Appendix B deals with the more exotic notions of tetrad theory, which admittedly stands in wider need of elucidation. Both appendixes are meant in any event to serve the useful purpose of establishing our notation and collecting formulas for easy reference in the main body of the book. The general reader may accordingly find it helpful first to peruse one or both of the appendixes before turning to the Introduction and Chapter 1. H. -j.

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