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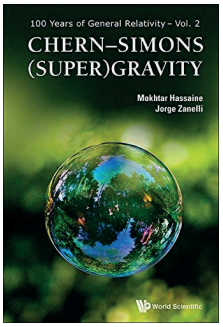


MOKHTAR HASSAINE AND JORGE ZANELLI

CHERN-SIMONS (SUPER)GRAVITY

SERIES 100 YEARS OF RELATIVITY. VOL. 2

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This book is a crystal-clear exposition of the multi-faceted landscape of gravitational Chern-Simons theories written by leading experts on general relativity and quantum field theory. Grown out of a set of lecture notes for advanced (graduate-level) courses, the volume condenses into about 130 pages major breakthroughs in theoretical physics spread over the last sixty years – from non-Abelian Yang-Mills gauge theories up to Chern-Simons topological quantum field theories, focusing on their connections with quantum gravity models, black hole solutions as well as on supersymmetric extensions in odd spacetime dimensions. In addition to being a very informative and up-to-date account of topics of continuous interest, the presentation is conceived so as to highlight very neatly the basic concepts and principles, on the one hand, and to provide concise and rigorous derivations of the most significant features of the various models, on the other.

In the first three chapters the reader can find an overview of quantized gauge theory interlaced with a critical analysis of the problems that prevent Einstein's general relativity to be interpreted as a consistent gauge theory in four-dimensional spacetimes. However, Chern-Simons actions in odd spacetime dimensions turn out to provide natural gauge-invariant theories belonging to the family of Lovelock gravity models, as explained in chapters 4 and 5. The special status and the far-reaching developments of such "gravitational" Chern-Simons theories are addressed in the rest of the book through a number of applications, such as the famous BTZ [Bañados, Teitelboim and Zanelli, 1992] black hole solution. Although a few highly specialized topics would require an advanced mathematical background, the core arguments are very appealing to people interested in a modern perspective on the basic (solved, and still open) questions in the search for consistent schemes for quantizing gravity.

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