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Gerhardt, Claus ([D-HDBG-A](#))

★**The quantization of gravity.**

Fundamental Theories of Physics, 194.

Springer, Cham, 2018. $x+200$ pp. ISBN 978-3-319-77370-4; 978-3-319-77371-1

This is an interesting as well as an important book. It conveys a programme of research inspired, introduced, and then developed by the author. The book's main focus is twofold. On the one hand, its scope is 'the quantization of gravity', and on the other hand it studies the use of specific mathematical tools applied to concrete models to support the claim that the technique can bring a (canonical) quantization to some cases. The point is that those cases are highly non-trivial and much beyond the common minisuperspace framework: hence the merit and significant importance of the author's book and results hereby reviewed.

The author makes a considerable effort in Chapter 1 to describe the tools necessary for this venture. This is a mathematical book, and it is understandably not easy to convey in simple terms what is basically contained in summarised lines in the corresponding papers and the references therein. Nevertheless, I have previously read some papers of this author and found the scope and progress quite fascinating. Hence, I welcome this chapter, but I would make a humble suggestion: not a broader book or a companion pedagogical book (or encyclopedic one), but instead a companion website, a pedagogical domain where anyone interested and not from a strong mathematical background could reach for more and eventually even immerse in this subject and lines of study.

Chapters 2 and 3 build on the tools described in Chapter 1, providing substance and illustrating the merit and power of these tools.

Chapters 4 and 5 present the main outcome (as mentioned). They deal with (rotating and simple) black holes, but I find myself asking: why the need for the negative cosmological constant? That is, why the anti-de Sitter (adS) backgrounds? Could quantization as described in Chapter 1 (and then discussed in Chapters 2 and 3) be performed with zero (or positive) cosmological constant? The adS is a typically inherited stringy background.

The more mathematical line on the canonical quantization approach presented in this work is very courageous and perhaps closest in spirit (if I may say) and elegance to the seminal papers by Bryce DeWitt (and decisive books like the one by Claus Kiefer). The author's contribution is quite important; I wish and hope to (gradually) understand its concepts better, and hence the suggestion I made above, which would provide a way to make anyone's effort in that pursuit more comfortable.

The book is, of course, well written, elegant, and well balanced. I would perhaps add a suggestion for a second edition, namely a modest set of paragraphs where the author would explain how each chapter is arranged and, basically, describe the content and purpose of this chapter or that section. The quantization of gravity is indeed the 'holy grail' of physics, and these mathematical charts do bring a welcome new perspective. But one needs at least a sort of quick guide for this beautifully detailed manual. Its absence is not a fault of the author's book—it is entirely due to the limitations of this reader, an interested one.

On the whole, for anyone doing research in quantizing gravity, the procedure and framework offered by this book will provide a wider and more complete perspective

on the challenge. In other words, this should become a textbook or a cited reference for consultation in any advanced course where quantum gravity is one of the main topics.

Paulo Moniz

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