

shifts to topics of current research: black-hole thermodynamics; Hawking radiation; the fate of objects before, during, and after crossing the event horizon; quantum entanglement; the holographic principle; AdS/CFT correspondence; and the connection between the previous two topics and quantum information. All are rather technical topics in the mathematical theory of black holes, yet the descriptions are both correct and easy to understand, with little mathematics. As such, this book is a very good introduction to those like myself who like a 'physics first' approach to GR: first understand the concepts then learn as much maths as necessary to work with them. While the entire book is good, I made a note of the fact that the chapters on white holes, wormholes, and Kerr black holes are particularly good. The only mistake I noticed is the old canard that John Wheeler coined the term 'black hole' (something Smethurst¹ gets right and which she discusses in some detail).

As almost always I notice a few matters of style which depart from my own preferences, but less so than in most books. There are many black-and-white figures, mostly space-time diagrams, scattered throughout the book, some of which also exist on the sixteen traditional glossy colour plates at the middle of the book. The four pages of endnotes are references to the technical literature (footnotes are proper footnotes). An eight-page small-print index ends the book. This is the best non-technical detailed introduction to the mathematical theory of black holes, a judgement which would probably stand even if there were others.

Recommended. — PHILLIP HELBIG.

References

- (1) B. Smethurst, *A Brief History of Black Holes: And Why Nearly Everything You Thought You Know About Them is Wrong* (Pan Books), 2023.
- (2) P. Helbig, *The Observatory*, **145**, 125, 2025.
- (3) W. D. Heacox, *The Expanding Universe: A Primer on Relativistic Cosmology* (Cambridge University Press), 2015.
- (4) P. Helbig, *The Observatory*, **136**, 204, 2016.

OTHER BOOKS RECEIVED

The Physics of Supernovae and Their Mathematical Models, by Alexey G. Aksenov & Valery M. Chechetkin (World Scientific), 2024. Pp. 279, 23.5 × 16 cm. Price £100 (hardbound; ISBN 978 981 12 8509 7).

A theoretical, and highly mathematical, monograph on supernovae, covering basic principles, numerical methods, and applications.

Introduction to Supergravity and Its Applications, by Horatiu Nastase (Cambridge University Press), 2024. Pp. 426, 26 × 18.5 cm. Price £64.99/\$84.99 (hardbound; ISBN 978 1 009 44559 7).

Aimed at PhD students, this volume covers the basic formalism of supergravity suitable for a focussed first course.