

the account is intentionally somewhat biased. On the other hand, it's an easy introduction to some complicated topics and sometimes it is good to be exposed to a different point of view.
— PHILLIP HELBIG.

References

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Gravitation for Theorists, by Piljin Yi (Cambridge University Press), 2026. Pp. 338, 24·4 × 17 cm. Price £70 (hardbound; ISBN 978 1 009 57564 5).

This book grew out of a single-semester graduate course taught by the author at Seoul National University and at the Korea Advanced Institute of Science and Technology (the author's affiliation is the Korea Institute for Advanced Study). To allow comparison with other books on General Relativity (GR) which I've reviewed in these pages, I assign it a relativity-book signature of 000+++.* As such, it is good for someone who wants to work through the mathematical details at a fairly high level. It is atypical for GR books in that Part III (three chapters) is about 'Canonical Field Theories with Gravity' (including a chapter on the ADM formalism) and there is an appendix on 'Fiber Bundles'; much more than most broadly similar books, it highlights connections between General Relativity and other branches of physics. (Parts I and II are 'Relativity and Geometry' and 'General Relativity', five and six chapters, respectively.) Except for some background on Special Relativity and Maxwell's equations, the book has practically nothing on the history of General Relativity.† I can't improve on the author's summary: "This book is intended as a self-contained handbook on the foundation of General Relativity. The content shies away from a comprehensive treatise that would cover all the nooks and crannies of gravitational phenomena. The emphasis is instead given to incremental developments of the underlying mathematics, explicit derivations of key formulae, and, in particular, examples and sidetracks that are meant to solidify the concepts and to prepare the readers for further applications."

Although, as expected, Chapter 7 on 'Cosmology in Brief' is indeed brief, there is nothing misleading or wrong in it. Non-flat cosmological models are also discussed, and even the Multiverse gets a few paragraphs. The discussion of the flatness problem (though restricted to the fine-tuning problem, *i.e.*, why was the Universe extremely flat immediately after the

*The characters indicate maths-first or physics-first, breadth, depth, level, difficulty of maths, mathematical detail shown. (+ indicates maths-first or more than average, – physics-first or less than average; o neither or about average.)

†For that, see another book¹ reviewed² in these pages.

Big Bang) and the effects of inflation is good (though I disagree that the flatness problem is actually a problem (e.g., ref. 3 and references therein)). In my review⁴ of a cosmology textbook⁵, I praised the author for explicitly introducing various forms of the Robertson–Walker metric. Something similar is done in this book for various representations of S^3 in the chapter on the Maurer–Cartan description (and the connection to the RW metric in cosmology is mentioned). The author is also aware that it is the Lorenz gauge (though there is no such entry in the six-page small-print index, though there are three Lorenz-related entries.) Apart from the usual topics and those already mentioned, the discussion of black holes (Schwarzschild, Reissner–Nordström, Kerr, Kerr–Newman) also includes the cosmological constant, and there is an entire chapter on the Maurer–Cartan description.

The book is a good introduction at a reasonably high level for someone who wants the work shown and is happy to forego the history of the topic. However, I found the book rather difficult to read, primarily because of the lack of definite and indefinite articles when they should be there and *vice versa*. In general, the book could have benefitted from editing by a native (or otherwise very good) speaker of English. There is also one instance (p. 223) where some text has obviously been left out. Similarly to the previous book on General Relativity⁶ I reviewed⁷ in these pages (also from Cambridge University Press), the wider margins are always on the left; more practical is to have them always on the outside. Several pages of my copy also became unattached; hopefully that is a one-off problem and doesn't affect the entire print run.

There are only a few black-and-white diagrams, scattered throughout the text. There are neither footnotes nor endnotes nor any sort of bibliography; only preface, main text (including appendix), and index. This is a no-frills detailed introduction to General Relativity and good for those who want to learn the subject by following worked-out derivations — PHILLIP HELBIG.

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Radio Universe: How to Explore Space Without Leaving Earth, by Emma Chapman (John Murray), 2026. Pp. 242, 23.5 × 15 cm. Price £18.99 (paperback; ISBN 978 1 529 39899 1).

I've read many popular-science books on astronomy, but this is probably the first which is mainly about radio astronomy. The author is a Royal Society Dorothy Hodgkin Research Fellow at the University of Nottingham and recipient of several awards; this is her second popular-science book about astronomy (thus only two books so far; there is another author named Emma Chapman; to add to the confusion, in the US this book is entitled *Echoing Universe*). Chapman was raised on radio, but in the BBC sense; she became interested in radio astronomy as a result of her PhD project, which involved radio observations from the Netherlands. An introduction mentions that project, tells a very brief history of radio astronomy, describes how radio telescopes work, and offers a somewhat longer exposition of the electromagnetic spectrum (including an obsolete reference to the colour indigo on p. 7). There is little about radio astronomy in the technical sense in the book; rather, it discusses the science which can be done *via* radio astronomy, sometimes containing asides about other radio-related topics.