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Weird Universe: Everything We Don't Know About Space (and Why It's Important), by Erika Hamden (Mango), 2025. Pp. 189, 20·5 × 13 cm. Price £15·99 (paperback; ISBN 978 1 68481 728 3).

Erika Hamden is professor of astrophysics at the University of Arizona, where she is also director of the Space Institute. In 16 chapters (plus introduction and conclusion), this is an 'interesting facts' book, in that respect similar to a few[1–3] I've reviewed[4–6] in these pages, though the chapters here are longer. One could group them into 'General Relativity and Cosmology', 'Stars', 'Planets' — moving in — before moving out to the early Universe, the future of the Universe, and the dark sector, concluding with a couple of summary chapters. The topics are perhaps 'weird' in the sense that they differ from our day-to-day experience, but are thoroughly mainstream science. (Of course, the book doesn't really include *everything* we don't know.) By choosing only a few topics, somewhat more depth is possible than with typical popular-science-level introductions to astronomy.

Sometimes good things come from mistakes. In this case, her clear statement (p. 90) that 'revolution' in the political (or similar sense) is due to Copernicus's 'revolutions' (the *revolutionibus* in the title of his famous book) having a similar effect on science caused me to investigate the etymology. Both stem from the Latin term for 'turn around', but both meanings arose independently. (In fact, in the political sense the original meaning was more that of a cycle or return to the 'good old days' than the violent overthrow of an *Ancien Régime*, the latter becoming common only after the French Revolution.) Thus, 'Copernican revolution' is a pun or loaded metaphor. But sometimes they don't. As is often the case, some common cosmological misconceptions are repeated, such as the ideas that dark energy is responsible for the expansion of the Universe (p. 158). A very charitable reading could make a case for a confusing passage (p. 165) being correct, but most readers will probably take from it that a 'coasting universe' "in which the expansion continues forever, but at an unchanging rate" would be substantially younger than our Universe. Actually, by what appears to be coincidence, the age of our Universe is almost exactly the same as that of such a 'coasting universe'[7,8]. It's not the first time I've wondered why an author is so confident (p. 165) that our Universe is spatially infinite (though of course the observable Universe is not). Observationally, we don't know, since it is very close to being spatially flat, which is the border between finite and infinite. Theoretically, there are various arguments favouring a finite Universe. Similarly, I've often read that it is possible to measure the recession velocity of a galaxy (p. 167); it can be calculated *via* $v = H_0 D$ (the Hubble constant relates the expansion rate to the proper distance, independently of the cosmological model — but if we already know the distance, we don't need the velocity to do cosmology.*) A somewhat rarer claim (p. 168) is that "the most distant galaxies . . . were moving away from us *faster* than they should have been if the expansion of the universe were constant" [emphasis in the original]. Actually, it is the other way around, as the present expansion rate is fixed by H_0; acceleration thus implies that distant galaxies were moving *more slowly* when the light we detect today was emitted. (The current expansion rate is of course given by $v = H_0 D$.) On p. 176: "Dark matter was first discovered and observed by the American astronomer Dr. Vera Rubin in the 1960s." The concept of dark matter and observational evidence for it goes back much further (*e.g.*, ref. 10 and references therein). (Also, "in the 1960s" is stretching it a bit; presumably the first flat-rotation-curve paper co-authored by Rubin[11] described some work which might

*See the more detailed discussion in another review[9] in these pages.

have been done in the late 1960s, but that paper did not claim evidence for dark matter.*) Equating fine-tuning with the Anthropic Principle (p. 183) is at best misleading. (To be fair, much confusion exists around those topics (*e.g.*, ref. 12 and references therein).) The claim that the early Universe was dense enough to be a black hole (p. 180) is at best misleading. On the other hand, she doesn't make the common mistake of claiming that Wheeler coined the term 'black hole' (p. 28). My guess is that, as in most popular-astronomy books, most of the mistakes concern cosmology, but I noticed some in other areas as well. Especially because of its historical importance in the discovery of asteroids (which *is* discussed), I missed a mention of the Titius–Bode rule for planetary distances; "every planet is about twice as far from the Sun as the planet before" is a much worse approximation (slightly more accurate only for the distances of Saturn and Uranus). I also wondered why "we don't have a deeper understanding of why" the conservation of angular momentum exists; surely Noether's theorem and the isotropy of space are sufficient.

A few other errors I put down to carelessness or bad editing. On the whole, though, the book is well-written and I have only about my average number of complaints concerning style and so on. I did find it rather distracting, though, that the text is in a sans-serif font with relatively large interline spacing (similarly to another book recently reviewed[13] in this *Magazine*). There are only a handful each of black-and-white photos and footnotes; there are neither references/bibliography/further reading nor an index nor any acknowledgements, but a short biography of the author.

Despite my qualms (which refer to only a minority of the subjects discussed), in particular my standard complaints about cosmological misconceptions, this is an interesting book which provides a good overview of many interesting topics in astronomy. — Phillip Helbig.

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Here and There

MAKES THE BLOOD BOIL

And this being June, when the sun is closer by, as it makes its presence felt the mercury will rise quickly.
—*The Sunday Telegraph, 2026 June 14, p. 32*

*In that paper, Rubin and Ford also mention earlier work by others; the claim that Vera Rubin discovered dark matter is certainly not due to her claiming that, as she acknowledged previous work.