



Stars: A Very Short Introduction

Andrew R. King

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Every atom of our bodies has been part of a star. In this lively and compact introduction, astrophysicist Andrew King reveals how the laws of physics force stars to evolve, driving them through successive stages of maturity before their inevitable and sometimes spectacular deaths, to end as remnants such as black holes. The book shows how we know what stars are made of, how gravity forces stars like the Sun to shine by transmuting hydrogen into helium in their centers, and why this stage is so long-lived and stable. Eventually the star ends its life in one of just three ways, and much of its enriched chemical content is blasted into space in its death throes. Every dead star is far smaller and denser than when it began, and we see how astronomers can detect these stellar corpses as pulsars and black holes and other exotic objects. King also shows how astronomers now use stars to measure properties of the Universe, such as its expansion. Finally, the book asks how it is that stars form in the first place, and how they re-form out of the debris left by stars already dead. These birth events must also be what made planets, not only in our solar system, but around a large fraction of all stars.

Stars: A Very Short Introduction Details

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From Reader Review Stars: A Very Short Introduction for online ebook

Dan Cohen says

Good book that does what the title suggests. Covers the physics, classifications, life-cycles etc. I found the introduction to the virial theorem a bit confusing - should probably re-read it as this is central to the rest of the book.

Keeko says

The most interesting and clearly written book I've read on this subject. In his preface, he mentions "there are simple equations and the book should be accessible to anyone with some recollection of school science," so I started off nervous trying to remember what I remember, but I never stumbled because he explains the ideas in a way that makes them very easy to understand. It may sound funny that a text on astronomy is a page-turner, but it's true. I could hardly put it down.

Shane Hall says

Comprehensive but problematic - the edition's proofing wasn't the best; King's explanations were often cloudy, and suffered from a wandering lack of focus.

Kevin says

Because I couldn't be bothered buying eclipse glasses, I figured I should at least read about the sun. This made up for it, really dense introduction to physics, chemistry and astronomy. Time well spent, as it was cloudy here, have to wait for 2024.

David Roberts says

The book I read to research this post was Stars A Very Short Introduction by Andrew King which is a very good book which I bought from kindle. I think you need a good knowledge of maths to understand this book & quite a lot of this book tells you how they calculate things like a stars mass. It's an interesting addition to this series although I preferred Galaxies & Planets in this series. The universe is twice as old as our sun and so isn't really as old as you might expect. The biggest stars are about 100 times as massive as the sun and the smallest are about 1/10th. Neutron stars are only about 10 kilometres in radius but have about the same mass as the sun and one cupful of matter from one of these would weigh tons. If a star has more than an initial mass of 7 times the mass of the sun it won't end its days as a white dwarf and will end as either a nova or supernova. That's when a star gets very hot and sheds much of its mass making it more bright. The reaction going on in a star is the conversion of hydrogen into helium by fusion or nuclear reaction. This is a chain reaction and some of the helium changes back into hydrogen due to being unstable at these high

temperatures. Other elements are made in this reaction but only relatively small amounts. The core of a star tends to be mostly helium. In a red giant the core is compressed until it spills out in a huge reaction making the star much bigger. These stars have a lower surface temperature than the sun hence they glow red.

Taufiq Habib says

What an amazing book! Quite technical as it needs to be to tell how we gained our knowledge of stars by observations, logic, and application of principles of science.

Taylor says

Kinda cool!

Jessica says

3.5

Louis says

really cool little book. the chapter on binary neutron/black holes and their other star the math was a bit hard to follow but the rest on size and luminosity and life cycles were really interesting. we are all start dust. (heard it before) the bit on how stars are formed was a little light. (heh heh) not sure if I read this more for astronomy or physics but it was fun for both.

Bojan Tunguz says

Stars are some of the most fascinating objects in the universe. They have exercised an oversize grip on our imagination since the dawn of humanity, and it's not hard to see why: one look at the clear star-sprinkled night sky will leave everyone in awe. Stars have been imbued with all sorts of meaning throughout history: religious, mystical, poetic, and prophetic. One of the major attitude changes happens when we realized that stars are in fact distant suns, and their faint glimmer is the consequence of their incredibly far distance from us. However, this only replaced one mystery with another: how do the Sun and all the other stars keep shining over the incredibly long time frames without changing their overall appearance noticeably. The solution to that puzzle was finally elucidated in the 20th century with the advent of our fuller understanding of microscopic Physics. This explanation – encapsulate in the field of astrophysics – is the basis of modern understanding of stars, and it is the subject matter of this very short introduction.

In order to properly understand star we need to be familiar with all the physical forces – nuclear, weak, electromagnetic and gravitational. We also need a solid understanding of thermodynamics and fluid dynamics. In other words – learning about stars is an excellent way of learning about Physics in general. This book provides an excellent overview of all the physical mechanisms and processes that go into making of a

star. The book goes into some detail of the evolution of individual stars. This is a very fascinating topic in its own right, especially when it comes to the later stages of stellar evolution. If stars are massive enough, then their ends can be quite violent resulting in a spectacular explosion known as a supernova. The remnants of such massive stellar endpoints are some of the most exotic objects in the Universe: neutron stars and black holes. These objects would in principle be hard, if not impossible, to observe, but fortunately there is enough of them in the binary stellar systems and in such configurations their existence can be deduced from the effects they have on the companion star and the surrounding matter. Unfortunately, unlike the end stages of the stellar evolution, the origins of stars are still much less well understood, and this is an area of active current theoretical and observational research.

This book is incredibly well written and lucid in its presentation. The author definitely comes across as an expert and authority in the field, and the book presents the best and latest understanding of the stars and their structure. My only issue with this book is that it may be a bit too advanced for the general reader. Many of its explanation and arguments seem very straightforward and reasonable, but in fact rely on the kind of physical intuition that you only develop after having taken a few semesters of college Physics. This is particularly true of the arguments that depend on simple proportionality equations and their manipulations. For us Physicists these sorts of equation manipulations become the second nature, and we tend to forget that most people rarely think along these lines in their everyday lives. If your general Physics background is a bit shaky I would suggest to keep these caveats in mind when reading this book.

Mills College Library says

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Laura says

I think this is badly written. I completed my MYP 5 personal project on stars and how they work, and as such was very excited about this. But this book was so convoluted, written confusingly with equations dropped in randomly in WORD format sometimes. The diagrams are also poorly placed. I'm not sure if this is just me? All I can say is that over this project I collected 243 sources (excluding ones I read through but didn't use/cite), and they all did a decent to good job at explaining the inner processes of stars, luminosity, etc.

This book, though.

Maybe I'm not smart enough for it? Maybe it's aimed at older audiences? Idk. Anyway, happy reading.

Mithun says

This book gives a good understanding of Stars and their life-cycle without going into too much of Mathematics.
