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Planetary and Space Science



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Book review

Protoplanetary dust, Daniel Apai, Dante Lauretta. Cambridge University Press (2010). £70, Hardback, ISBN: 978-0-521-51772-0

The question may arise, why there is an almost 400 pages thick book available dealing with nothing else than dust. However, this content-rich book provides a comprehensive picture of the role of the first solids in the early stages of our Solar System as well as in the evolution into the planets and small bodies we know today.

If you ever asked yourselves the question: 'Where do we come from?' than this book helps you on your way to the answer. This simple question proved to be very difficult to answer for planetary scientists and astronomers conducting theoretical and laboratory studies as well as observations. The book focusses on planetary formation mainly, but also links star formation into the discussion of one of the most challenging topics in planetary sciences today. If the former mentioned question is slightly rephrased into 'What are we made from?' you will after having read the book proudly give the answer: protoplanetary dust. The editors D. Apai and D. Lauretta show an enjoyable to read compilation of everything there is to protoplanetary dust and any reader will surely agree that there is far more to it than dirt.

The editors themselves wrote the first chapter, which is not only providing a good introduction to planet formation and protoplanetary dust in general but also a good 'entry' into the remaining nine chapters. Even scientist from an outside field will enjoy the presentation of the various aspects of planet formation and the still open questions. The other chapters of the book are authored by a "who's who" of protoplanetary disks and planet formation.

The nine chapters after the introduction draw a chronological picture from the very first beginnings of a solar or planetary system in general to the rocky planets of our solar system today. The second chapter consists of discussions on origin of protoplanetary dust as such and the formation of stars. As dust is accumulating disks around young stars the former topic is followed by an introduction to the evolution of protoplanetary disks. A detailed overview of the chemical and isotopic evolution of the solar nebulae and the solids within is given in chapter 4. Chapter 5 deals with laboratory studies of dust analogs, material available on Earth reflecting properties expected from the material from 'outer space'. Logically this chapter is followed by one dealing with the composition of protoplanetary dust. In chapters 7 and 8 the more theoretical world of protoplanetary dust is entered, where the particle size evolution and thermal processes are introduced. Chapter 9 describes the clearing of protoplanetary disks in general and as well for the special case of our solar system. The last chapter closes with a description of rocky planet accretion including discussions about the influence of giant (gaseous) planets on the formation of terrestrial planets and the asteroid belt.

Every chapter is finished with an extensive reference list, where a rich amount of publications regarding the respective topic can be found. Also, there are three appendices providing an overview of the common minerals in our solar system, an introduction to mass spectrometry and the basics of light absorption. Readers not familiar with these specific information may find a more detailed explanation to techniques here, while they would only lead to far away from the topics discussed in the book itself.

I personally found the glossary and index part of the book particularly useful, especially if I ever have to come back to refresh my knowledge. Also the tables and figures contribute nicely to the understanding and illustrate the text sufficiently.

In conclusion, the book can be recommended not only to planetary scientists working in the field of planet formation but also to students who seek an introduction to this enormously challenging topic. The organization of the contents makes it possible to concentrate on certain aspects, as few people will be experts in all topics. Having the book on your shelf gives you the confidence that the comprehensive overview of the history of solids in our solar system from a simple grain to the beautiful planet we live on is just a move away.

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