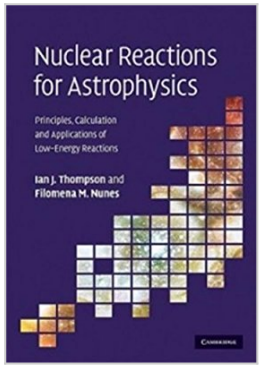

Nuclear Reactions for Astrophysics: Principles, Calculation and Applications of Low-Energy Reactions

By Ian J. Thompson, Filomena M. Nunes

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Describing the processes in stars which produce the chemical elements for planets and life, this book shows how similar processes may be reproduced in laboratories using exotic beams, and how these results can be analyzed. Beginning with one-channel scattering theory, the book builds up to multi-channel reactions. Emphasis is placed on using transfer and breakup reactions to probe structure and predict capture processes, as well as R-matrix methods for modeling compound nucleus dynamics described by Hauser-Feshbach methods. Practical applications are prominent in this book, confronting theory predictions with data throughout. The associated reaction program Fresco is described, allowing readers to apply the methods to practical cases. Each chapter ends with exercises so readers can test their understanding of the materials covered. Supplementary materials at www.cambridge.org/9780521856355 include the Fresco program, input and output files for the examples given in the book, and hints and graphs related to the exercises.

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- Sales Rank: #2060343 in Books
- Published on: 2009-07-31
- Original language: English
- Number of items: 1
- Dimensions: 9.72" h x .94" w x 6.85" l, 2.40 pounds
- Binding: Hardcover
- 480 pages

Editorial Review

Review
"The effort of the authors, both highly regarded experts in their respective fields, is certainly to be lauded and I am confident that the book will become essential reading for the experienced researchers in the field." Marialuisa Aliotta, The Observatory

About the Author
Ian J. Thompson is a Nuclear Physicist in the Nuclear Theory and Modeling Group at the Lawrence Livermore National Laboratory, USA, having until 2006 been Professor of Physics at the University of Surrey, UK. His research deals with coupled-channels and few-body models for nuclear structure and reactions, especially concerning halo nuclei. He is a Fellow of the Institute of Physics.

Filomena Nunes is an Assistant Professor in the Department of Physics and Astronomy, and the National Superconducting Cyclotron Laboratory, at Michigan State University. Her research has focused mainly on direct nuclear reactions as a tool for nuclear astrophysics with particular emphasis in breakup and transfer.

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