BASIC NMR HANDBOOK

Written by M. A. Eastman
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# Basic NMR Handbook

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Preface

Written in 2018

In 2013-2018 the Handbook receives a long overdue revision. Outdated technical details are removed, the introduction to operation of the Agilent (formerly Varian) spectrometers is updated for VNMRJ 4.2, and instructions for operation of the Bruker AVANCE spectrometer (automated A400) are included. With our new emphasis on automation using the A400, users have expanded capability to try many multi-pulse sequences. A new chapter (Chapter 3) on basic 2D spectra and how to interpret them for resonance assignments and structure determination has been added, along with instructions on obtaining these spectra on the instruments (Chapters 5 and 7) and a separate chapter on data processing (Chapter 6). Variable temperature operation instructions for the Inova 400 are in the separate Chapter 8.

Written in 2001

This book originated in 1997 when I combined a basic introduction to one-dimensional (1D) NMR with notes on how to obtain 1D spectra on the Varian instruments. It was intended to initiate new users and serve as a reference handbook for experienced users. When some of the material became out of date, and it became clear that the scope of the handbook was too small and its organization too simple to serve our users, some of whom immediately find need for more advanced techniques, I decided to revise and update the handbook. This revision includes, among other things, a rearrangement and enhancement of the introductory instructions for running the instrument, a small introduction to the structure of liquid-state spectra, and consideration of a variety of multiple-pulse techniques, with descriptions of the experiments and instructions on how to acquire and process them. The organization has been improved with a thorough table of contents and extensive index.

A difficulty in producing the handbook has been to decide what or how much to include. This is true for both the theoretical introduction and the spectrometer operating instructions. For the former we have a variety of published books on NMR, and for the latter we have the Varian manuals. Why not just use these resources, rather than create a new book? The answer in both cases is that the available literature is too large and imposing, and the required information for the novice or intermediate NMR user is scattered throughout this literature. The beginner needs a brief, well-organized source of salient information, not having the time to work through a large body of literature. Having said this, it also needs to be stressed that the handbook in its brevity has limitations, and intermediate and advanced users will want to consult the other available resources.

The handbook remains intended as an introduction for new users and as a reference for experienced users. With the additional topics included and the index to facilitate location of information, it should find more effective use as a reference than the previous version. Of course, the handbook will probably continue to evolve. Suggestions to guide this evolution are welcome.