

# Nuclear Magnetic Resonance

## Preface

Nuclear magnetic resonance is an enormously powerful and versatile technique for investigating the structure and dynamics of molecules. These days it is difficult to find a Chemistry laboratory without an NMR spectrometer or an undergraduate Chemistry course without a set of NMR lectures. This book offers a clear, concise introduction to the physical principles of NMR of liquids, and the interactions that determine the appearance of NMR spectra. The six chapters describe and explain how nuclear spins interact with a magnetic field (the chemical shift) and with each other (spin-spin coupling); how NMR spectra are affected by chemical equilibria (exchange) and molecular motion (relaxation); and concludes with an outline of the workings of a few one- and two-dimensional NMR experiments. I have made every effort to keep things simple: only essential mathematics and theory are included. The emphasis throughout is on understanding the foundations of the technique and how it may be used to study problems of chemical interest.

The shape and content of this short book owe much to those who taught me magnetic resonance—Keith McLauchlan, Rob Kaptein and Ray Freeman—especially to Keith and Ray whose Oxford undergraduate lecture courses I inherited ten years ago, and on which this book is based. I am indebted and profoundly grateful to all three.

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