*CAMBRIDGE MONOGRAPHS ON PHYSICS*



# NUCLEAR STABILITY RULES

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BY

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## GENERAL PREFACE

The Cambridge Physical Tracts, out of which this series of Monographs has developed, were planned and originally published in a period when book production was a fairly rapid process. Unfortunately, that is no longer so, and to meet the new situation a change of title and a slight change of emphasis have been decided on. The major aim of the series will still be the presentation of the results of recent research, but individual volumes will be somewhat more substantial, and more comprehensive in scope, than were the volumes of the older series. This will be true, in many cases, of new editions of the Tracts, as these are re-published in the expanded series, and it will be true in most cases of the Monographs which have been written since the War or are still to be written.

The aim will be that the series as a whole shall remain representative of the entire field of pure physics, but it will occasion no surprise if, during the next few years, the subject of nuclear physics claims a large share of attention. Only in this way can justice be done to the enormous advances in this field of research over the War years.

N. F.
D. S.

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# AUTHOR'S PREFACE

This short monograph has been more than five years in preparation, and much of it has been re-written several times during that period. Its origins date back even further: the germ of Chapter III, § 3, is to be found in a British Atomic Energy Report written in April 1943, and the hard core of Chapter II in another report, of the same series, dated August 1945. Chapter I was completed in first draft in 1946. Only Chapters III and IV, in their present form, are the result of fairly continuous writing. In such circumstances it cannot be expected that the attempt to bring the whole work up to date, as at the time of delivery to the printer, could be uniformly successful. Nevertheless the attempt has been made, the relevant date being mid-December 1951.

More difficult than the continual revision of experimental results quoted in the text (or incorporated in the diagrams) has been the maintenance of a steady aim in presentation, during a time in which the subject has developed with such amazing rapidity. The more reason, then, that that aim should be plainly confessed, now that the writing is done. It has been, throughout, to survey the results of experiment, interpreted as providing information concerning the stability properties of the normal (ground) states of nuclei, with a view to eliciting the significant regularities. Pursued literally and exclusively, this aim would issue in an impossibly dreary performance; obviously, the exercise in pure empiricism must be relieved by an assessment of significance in terms of current 'theoretical' ideas—if it is to be rewarding, even if it is to be comprehensible. But it cannot too often be emphasized that, in so far as they are free from unsuspected error, the experimental results are unalterable; the theoretical ideas are not. Stated crudely, the aim of this monograph has been so to marshal the experimental facts that the theorist is most likely to be inspired by valid—even 'correct'—ideas on contemplating them. If there is any who will say that the theorist has no need of the facts in order to be inspired by a valid theory, this monograph is not addressed to him.

NORMAN FEATHER

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