

FIFTY YEARS OF NUCLEAR FISSION

by

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ABSTRACT

This report is the written version of a colloquium first presented at Argonne National Laboratory in January 1989. The paper begins with an historical preamble about the events leading to the discovery of nuclear fission. This leads naturally to an account of early results and understanding of the fission phenomena. Some of the key concepts in the development of fission theory are then discussed. The main theme of this discussion is the topography of the fission barrier, in which the interplay of the liquid-drop model and nucleon shell effects lead to a wide range of fascinating phenomena encompassing metastable isomers, intermediate-structure effects in fission cross-sections, and large changes in fission product properties. It is shown how study of these changing effects and theoretical calculations of the potential energy of the deformed nucleus have led to a broad qualitative understanding of the nature of the fission process.

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