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## Contents

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### NEUTRON PHYSICS FOR NUCLEAR REACTORS

#### Unpublished Writings by Enrico Fermi

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## Introduction

### Historical prelude

It has been known for many years that vast amounts of energy are stored in the nuclei of many atomic species and that their release is not in contradiction with the principle of the conservation of the energy, nor with any other of the accepted basic laws of physics. In spite of this recognized fact, it was the general opinion among physicists until recently that a large scale release of the nuclear energy would not be possible without the discovery of some new phenomenon. [Fermi (1946b)]

### *The discovery of the fission of uranium and the possibility to produce a chain reaction*

Such a new phenomenon, as mentioned by Fermi in one of his reviews of 1946, was that observed by Otto Hahn and Fritz Strassmann in the Fall of 1938 at the Kaiser Wilhelm Institute in Berlin, when bombarding the uranium nucleus with neutrons from a radium-beryllium source. The correct explanation of the Hahn and Strassmann experiments was soon given by Lise Meitner and Otto R. Frisch who interpreted the observed phenomenon as due to the splitting of uranium, from which two elements formed, each of approximately half of its original mass. The mass which "disappeared" was assumed to be converted into energy, according to Einstein's theory of relativity.

The news of the novel phenomenon reached the other side of the Atlantic Ocean just after Fermi and his family arrived in America, after receiving the Nobel Prize in Stockholm.

Niels Bohr, who had come for a stay at Princeton, was on his