

## Preface

The present book contains the proceedings of the 5<sup>th</sup> edition of the International Workshop on Nuclear Fission and Fission Product Spectroscopy (FISSION 2013), which took place in Caen, on 28–31 May 2013.

This workshop is held in France approximately every 4 years since 1994. The first two editions were organised nearby Grenoble, where important work on fission is being performed at the Institut Laue Langevin (ILL) Research Reactor. It moved then for two editions to Cadarache, an important centre in France for Nuclear fission research and applications, and the place where the new Research Reactor Jules Horowitz is being built. The 5<sup>th</sup> edition took place in Caen, where the Neutron For Science facility (NFS) is under construction and the new ISOL facility for exotic beams based on Uranium fission at moderate energies, SPIRAL2 Phase2, is foreseen.

The workshop is jointly organized and funded by the ILL, the CEA/(DSM and DAM), CNRS/IN2P3, ENSICAEN, and GANIL, with the support for this specific edition of the town of Caen, the CNRS/DR19, EDF, INSTN and the General and the Regional Councils.

The workshop gathered 80 participants from the international community in the Museum of Fine Arts inside the walls of William the Conqueror Castle, in the town centre of Caen. During the workshop, it was again confirmed that nuclear fission is a pillar of the field of nuclear physics, as it is a process where the complexity of the atomic nucleus takes its full extent.

Fission is the best-suited process for the production of neutron-rich heavy exotic beams, whether in-flight or ISOL, and new phenomena in nuclear structure of very exotic species are being investigated with fission products. Fission mechanisms are of fundamental importance for the production of super heavy elements, which is one major argument for the construction of new exotic-beam facilities.

The fission dynamics and the related observables give hints on a general scientific challenge, how a finite quantum system rearranges and relaxes the different degrees of freedom when submitted to moderate to high excitation.

Nuclear fission is also the field for the development of new instrumentation based on state-of-the-art techniques, such as active targets or spectrometers, and new observables appear thanks to the use of reverse kinematics now used at heavy-ion facilities. Part of the developments is motivated by the need of more accurate and precise data in the framework of nuclear-energy sustainability and radioactive-waste management.

Finally, let us mention that nuclear fission is also important for other fields of physics, as recently the re-evaluation of the anti-neutrino spectrum measured in nuclear reactors has shown a significant deviation that could sign the existence of sterile neutrinos.

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The workshop was divided into 7 different sessions, all plenary:

- Gamma Spectroscopy of Fission Products,
- Prompt Gamma and Neutron Emission in Fission,
- Super-Heavy Elements,
- Fission Theory,
- Instrumentation dedicated to Fission,
- Fission Yields,
- Fission Dynamics,
- Fission Cross Sections

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