

Opening address

Bernard BIGOT

Haut commissaire à l'énergie atomique

Mister Chairman, Ladies and Gentlemen,

It's a great pleasure and honor for me to welcome you all to Nice for the 2007 International Conference on Nuclear Data for Science and Technology. Indeed, I am very pleased to see such a large attendance to this important scientific meeting and I wish to congratulate the organizing committee warmly for such a success. This series of conferences aims at bringing together scientists and engineers that are involved in the production or use of nuclear data. I am quite confident that such a conference helps efficiently at promoting the long-term joint efforts that are definitely needed to produce and to use broadly nuclear data always more precise and reliable, more complete and more consistent. The renewal of interest on nuclear data, as well as on nuclear basic science, which I and many others are pleased to contemplate today is, to my opinion, the consequence of a better perception of the assets of nuclear energy by public opinion and decision makers and of the increasing confidence in the safety of the nuclear technologies, knowing well that we ought to remain vigilant on this point.

A foreseen growth of the demand of energy and more specifically of electricity all over the world within the present century, whatever the energy savings we could afford, surely will lead to a large scale development of nuclear energy worldwide. Today, commercial nuclear power reactors are providing safe, abundant, competitive and permanent energy without emission of carbon di-oxide and other greenhouse or polluting gases. Nevertheless, the populations expect big efforts to manage nuclear wastes in a more sustainable and fully secure way. The general purpose is to minimize substantially waste amounts and reduce significantly proliferation risks by recycling used nuclear fuels and reprocessing spent fuel, which requires the development of new techniques.

Whatever the technological progresses, during the major part of the 21st century, the nuclear energy will be mainly produced from thermal nuclear reactors. However major international cooperation programs are focusing on medium- and long-term research. Their objective is the optimization of the use of natural uranium's energy content in fast reactors and the preparation of their deployment as soon as their economic competitiveness is established. For example France is convinced that the best way to proceed is to follow a continuous improvement passing from the graphite-gas first generation of reactor to the fourth fast neutron reactor generation. We are presently moving to the third one with the EPR in Flamanville expected to be operative in 2012 while the fourth generation will be in the forties.

As to the world ITER project which will be the step further, three key areas justify the on-going completion of many fusion data files: tritium breeding in the blanket, shielding of the magnet region and neutron induced radiation damage in the first wall.

France is fully concerned by the progress in nuclear technologies. I'll limit myself to four examples: as I told a few minutes ago, EDF, the French electricity producer has been authorized a few months ago to launch the construction of the EPR, the first of a new generation of light water reactors. In addition to safety improvements and reduction of waste, increasing the burn-up rate of UO₂ and MOX fuels and optimizing plutonium consumption are key objectives of optimization of EPR.

The CEA is in charge to design a fast reactor prototype working in closed cycle and satisfying sustainable developments of the fourth generation of nuclear reactors. The French parliament voted, in 2006, a law specifying the management of waste. A part of this program is related to research on the partitioning and transmutation of long-lived radio nuclides in order to reduce the mass and the toxicity of the waste. The success of this research program relies much on the fulfillment of a large number of nuclear data requests on minor actinides produced during irradiation and still present long after cooling and storage periods. In addition, alpha emission from actinide decay, ternary fission and (n, α) reactions have to be implemented. They are responsible of helium production, during and after irradiation, which enhances the pin inner pressure up to critical values especially in MOX fuels.

About fusion, I am pleased to stress the French contribution to the ITER program and happy with the choice of Cadarache to host the largest Tokamak ever built in the world.

The range of nuclear data required for the optimal operation of existing reactors or in the design of more competitive ones, while keeping the same safety requirement, is still large.

In order to take advantage of the accuracy of the numerical simulations offered by the availability of super computers and the quality of neutronics codes coupled with thermo-hydraulics codes, we need more and more complete nuclear data files with reduced margins of uncertainty. Several sessions will be devoted during this week to the numerous nuclear data activities.

The success of the conference will be associated with the progress in two major items: first, in sensitivity calculations with evaluated files including covariance matrices which provide the essential information for reliable uncertainty estimates and, second, in the benchmarks for fission application such as those carried out in international collaboration on the three French critical facilities EOLE, MINERVE and MASURCA. The quality of the integral measurements on these facilities not only provides confirmation of calculation methods using differential cross section data, but, also, tends to consider them as a source of data.

Some sessions will deal with theoretical methods, notably those involving microscopic or semi-microscopic models dedicated to the calculation of cross sections in various energy ranges. These theoretical efforts ought to be strongly supported in order to achieve a set of coherent data using only nuclear reactions models, especially for actinide nuclei where the competition of the fission process must be treated in details and consistently with other exit channels.

Neutron measurements in the thermal and resonance range along with their analyses will be presented in several oral and poster sessions. In the near future, SPIRAL 2 will extend to higher energy the range covered, in Europe, by GELINA and n-TOF where many of those measurements have been done. At intermediate energy, the heavy-ion facility FAIR, to be built in GSI at Darmstadt, will allow spallation studies in connection with the ADS program.

Looking at the full program of this busy week, it appears that other areas are also concerned with nuclear data such as space, medicine, astrophysics to mention only a few of them. All of these presentations are shared in several sessions and will be heard with interest.

All the efforts on reliable nuclear data would be useless without the role of the NEA data bank in charge of the Joint Evaluated Fission and Fusion project. It's why this conference is also organized under the auspices of the OECD Nuclear Energy Agency. I am happy to address my kind regards to Dr. Akira Hasegawa, the Head of the NEA Data Bank who opens this session with me.

I wish a full success to the 2007 International Conference on nuclear Data for Science and Technology and I hope there will be time for all of you to enjoy, in addition, the delights of the French Riviera.

Thank you for your attention.