Contribution ID: **6** Type: **Oral**

Splicing EXFOR for the next decades and beyond

Considerable experience and know-how has been acquired on basic nuclear data since the dawn of the nuclear age, however some of this achievement has been selective with regard to purpose and application and done through fitting, profiling the underlying cross section with the essential and available at time experimental information usually contained in EXFOR [1]. The experiments it contains are numerous, were pioneering and founding – they shaped our actual knowledge and allowed the safe development of primarily fission applications. Through the NRDC network this experimental world-wide data library for neutron and charge particles induced reaction is updated regularly, circa 400 new entries per year. Such methodology, fit for the purpose it has been designed for, came at a price: a proper, correct physics understanding of the compensation, correlation at play throughout the complex evaluation and simulation processes was overlooked – the single application driven data requirement differed significantly from the needs of today multi-physics applications.

Tremendous progress in evaluation methodology, simulation capabilities, granularity, and completeness in terms of targets, surrounding media, particle and energy ranges has been achieved since then enabling more detailed and probing aspects of the underlying physic to be unearthed and revealed. Many more of the 42 basic quantities (cross-section, double/triple differential, multiplicity, product yields, gamma emission, resonance parameters, integral, reaction rate, etc..) stored in EXFOR can be routinely accessed and put to work in unison.

Since the turn of the century, advanced physics model, simulation probe has highlighted certain short-cuts taken and shortages in the process biased toward one aspect of the fission industry: criticality. Modern global physics model, that rely on EXFOR entries for profiling also allows extension, supplementation and enhancement of the basic nuclear data so necessary to the modern shielding and non-criticality applications: accelerator, fusion, medical, metrology. Physics models also allow us to go where no experiment could go, usually with uncertainty. Modern data analytics unearth new finding, correlation in support of the physic models.

A modern, clearly labelled, thoroughly checked, regularly updated, advantageously deployed EXFOR experimental database, fortified to cater for the applications that depend more of the fast range is in the making. This paper will introduce IAEA's driven activities in the area of nuclear data experimental mining and analytic in support of various applications and relying on recent/coming-up experiments.

[1] "Towards a More Complete and Accurate Experimental Nuclear Reaction Data Library (EXFOR): International Collaboration Between Nuclear Reaction Data Centres (NRDC)", N. Otsuka et al., Nucl. Data Sheets 120, 272 (2014)

Primary authors: Dr SUBLET, Jean-Christophe (IAEA); Mr OTSUKA, Naohiko (IAEA); Mrs OKUMURA, Shin (IAEA); Mr ZERKIN, Viktor (IAEA)

Presenter: Dr SUBLET, Jean-Christophe (IAEA)