Contribution ID: **78** Type: **not specified**

Aggregate Decay Behavior of Fission Products in Nuclear Reactors -Decay Heat, Reactor Antineutrino and the Pandemonium Problem-

Tuesday 12 June 2018 12:20 (20 minutes)

The decisive importance of fission-product (FP) decay heat (DH) was far and widely recognized after the core-melt accident at the TMI nuclear power station in 1979. Even before this, in the late 1970s, a lot of experimental and theoretical studies on FPDH were motivated and initiated in Japan, the US and Europe. In these countries, extensive FP decay data libraries to be used in DH summation calculations were elaborated from the up-to-date FP decay data which had been taken from the high-resolution γ-ray measurements. Optimistic expectation for good agreement between the experimental and the theoretical results, however, were not materialized with one exception. That is the JNDC (Japanese Nuclear Data Committee) Library where the gross theory of β-decay was employed for supplementing the insufficiency of the experimental decay data which was not yet perceived clearly then. In due course beyond the TMI accident, the origin of the disagreement was identified as the Pandemonium problem which had been warned of by Hardy et al. based on computer simulation. The best experimental way to overcome to this difficulty, which is intrinsic to high Q_β-value decay, is now recognized as the total absorption γ-ray spectroscopy (TAGS). After the extensive effort at Idaho in the 1990s, TAGS was further motivated by series of the IAEA meetings on this subject since 2006 up to the present from the view points both of nuclear science and technology. Another important aspect of the aggregate FP in reactor cores is as the emitter of antineutrinos ($\bar{\nu}_e$). It is stressed that the gross theory of β-decay still have potential to play an important role in investigating the reactor $\bar{\nu}_e$ flux and its energy spectrum along with the steadily accumulating TAGS experimental data at present.

Author: Dr YOSHIDA, Tadashi (Tokyo Institute of Technology)

Presenter: Dr YOSHIDA, Tadashi (Tokyo Institute of Technology)

Session Classification: Fission

Track Classification: Fission