Installation of a Database for Nuclear Structure and Decay Data

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1. Content of the Database

In 1979 the Information and Computing Center of the
Central Institute for Isotopic and Radiation Research
(ZfI) at Leipzig started with the installation of a
computerized database for nuclear structure and decay
data (NSDD). For it the institutes ES 1040 computer
with the operation system OS is used. After working out
the software für handling and retrieval of the data at
the end of 1980 the following international NSDD-files
had been available:

	records	datasets
ENSDF	6.741	287.867
GAMDAT'78	2.049	55.178
WAPSTRA	1(1.992)	1.992
ENDF/B-4 FPL	824	105.009
NSR		69.548 Refs.

ENSDF   - Evaluted Nuclear Structure Data File
             edited and maintained by the Nuclear Data
             Project. Oak Ridge National Laboratory

GAMDAT'78 - File of gamma rays based ond
             Erdtmann and Soyka (sometimes called
             JUELGAM)

WAPSTRA   - 1978 Atomic mass evaluation of Wapstra
and Bos
ENDF/B-4   - only fission products library
NSR   - Nuclear Structure References

ENSDF, WAPSTRA and ENDF/B are used in their original
formats. For handling GAMDAT on own internal data-
format had been developed. NSR is converted into a
format demanded by the used software system.
All this files the Information and Computing Center
recieved from the Nuclear Data Section of the IAEA
Vienna.

2. Work with ENSDF

The Evaluated Nuclear Structure Data File (ENSDF)
ist the international standard for NSDD data. For its
handling a number of PL1 programmes had been deve-
loped:

        RECH1   retrieval in ENSDF
        LIST   printing on "Edited Listing" of datasets
        DLIST   printing datasets with some comfort
        TEST   printing a catalogue of ENSDF-file

For editing data catalogues the information retrieval
system USS is used. As a special data catalogue e.g.
a "Catalogue of Half-Lives in ENSDF" was edited and
distributed.

3. Handling of GAMDAT

In 1979 the Information and Computing Center recieved
the GAMDAT-file produced by Erdtmann and Soyka. We
suppose the record length of 100 byte and the exchange
format of this file to be relatively unfortunately for
a computerized surch. An own internal structure for
GAMDAT had been developed. It has the following charac-
teristics:
. record length 48 bytes
. each record has an 11 byte identifier field
. to get an unique data access in the different
   files of the institutes database ENSDF like

element names are used (English names and left
adjusted)
the names of the describing fields are
explicitly given in the corresponding records.

GAMDAT is splitted into two internal data files. One
file contains the datasets of nuclides and the other
one energy sorted records. A third file contains a
description of GAMDAT and a list of abbrieviations.
The records of the energy sorted file contain energy,
intensity, half-life, Z,A and element name.
For handling this files the programm system USS
(series USS-3) is applied. The same procedures deve-
loped for GAMDAT also are used for its new version
GAMDAT'78.

4. First steps with NSR

In 1980 the effort to make available the NSR file for
the users was continued. NSR was converted from external
ADSEP format into the L1-structure demanded by the
information retrieval system USS. This fields that
contain a limited (normal) character set had been
used.
For a retrieval all this fields and also parts of them
may be used. The NSR version of the Central Institute
of Isotopic and Radiation Research contains the refe-
rences from 19:0 to 1979 with a small gap 1969 and 1970
resulting from an error an the exchange tape. The file
is stored on magnetic tape and the surches are made in
a sequential manner. The first experiences showed that
NSR fulfil most of the needs arising from nuclear
structure physics and also from nuclear reaction re-
search. In a special case (internal conversion
coefficients) it was difficult to find the correspon-
dence between NSR and ENSDF.

5. Use of the Database in 1980

The standard output from the database for nuclear struc-
ture and decay are listings of datasets and computer-

edited data catalogues printed upon user requests.
In 19.0 also primary literature (e.g. IAEA reports)
was given to the unsers. First steps to use NSR had
been done.
The following table should give some details:

- user requests   39
- datasets and references
  printed   2.550   (among them 264 refs.)
- surches in datafiles   65
- surches in NSR   19
- special catalogues printed
  upon user request   10
- primary literature for users   9
- users information   1

For the next time we will continue in working out new
programmes and procedures for handling ENSDF. After
recieving the ne NSR-format we will apply it and improve
the retrieval possibilities.