



The CDFE
Relational Nuclear Spectroscopy Data Base NESSY in Internet

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The several directions of special software development have been described before for convenient search for the ENSDF information:

- the USA NNDC programs provided the output information from the ENSDF in a form similar to that of the Nuclear Data Sheets, on-line retrieval system, special programs MEDLIST and RADLIST for medical applications;
- the Sweden Lund University and Institute of Technology nuclear radioactive decay γ -radiation characteristics database;
- the Russia CDFE data library based on the ENSDF /1/ as the bank of more than 15 programs for the ENSDF operation;
- the USA LBL Electronic Table of Isotopes for the personal computer (announcement).

It must be pointed out that there is the one general restriction of the all programs mentioned above. Each of them is searching for the only a given the ENSDF file information subset.

The relational nuclear spectroscopy data base NESSY (New ENSDF Search SYstem) has been developed before /2/ for using on PC and compatible computers. This is a very powerful tool for scientific research which use the nuclear spectroscopy information because it has an evident advantages in comparison of other software for database operation with the ENSDF mentioned above:

- configuration on both search conditions and output information is not limited;
 - automating formation of tables containing the search parameters can be included in the common query configuration:
 - Query_1 (ENSDF) \Rightarrow Result_1,
 - Query_2 (Result_1) \Rightarrow Result_2,
 - and so on;
- requests are posed by means of both values and the relations between them;
- performing arithmetic and other operations over searched values is possible.

The following are the only three of many examples of information combined from the several ENSDF subsets search tasks of great importance for the number of applications:

- for ecology needs to follow the decay chains till the stable isotope appearance of every radioactive isotope requested (about 250 nuclides) and indicate decay mode, final nucleus, half-life, and branching ratios for every decay (since the final nucleus of the majority of decays is the parent nucleus for the next decay, the "query chain" scheme is needed);
- for nuclear waste utilisation needs to indicate all levels with known γ -decays and renormalize the data obtained so that the sum of intensities for every level is equal to 1; to find and indicate all metastable states; to determine if radioactive decays of the

nucleus exist (both for ground and excited states) and, if so, indicate their modes, half-life times, and the average excitation of the final nuclei;

- for an activation analysis needs to find the levels in number of nuclei requested having the energies equal to the energies of absorbed and radiated γ -quanta with the nucleus recoil taking into account.

It is clear that these requests practically can not be processed by systems mentioned above. The NESSY can do that very simply.

Now NESSY is put partially upon the CDFE Web-site (<http://depni.npi.msu.su/cdfe>) using the MySQL data base management system.

This gives to all people who have Web-browser the possibilities for:

- solve all the tasks that can be solved on existing search systems on ENSDF in the world and additionally a number tasks that can be solved on the NESSY only;
- receive the rapid access to any data from the ENSDF;
- do the search job with simplicity and clearness because NESSY's user interface is very friendly: CUI (Common User Interface) standard is keeping out.

References

1. *I.N.Boboshin, V.V.Varlamov. The International Evaluated Nuclear Structure Data File (ENSDF) in Fundamental and Applied Photonuclear Research. INDC(CCP)- 297/GE, IAEA NDS, Vienna, Austria, 1989, pp. 1 - 8.*
2. *I.N.Boboshin, V.V.Varlamov. The New ENSDF Search System NESSY: IBM/PC Nuclear Spectroscopy Data Base. Nucl.Instr. and Meth., A369 (1996) 113.*