

**NUCLEX – an IBM PC Version of Handbook  
on Radionuclide Production Cross Sections at Intermediate Energies**

**V.I. Ivanov, N.M. Sobolevsky**

Institute for Nuclear Research of Russian Academy of Science, Moscow

**V.G. Semenov**

Research Center of Spacecraft Radiation Safety of  
the Heals Ministry of Russia, Moscow

(Russia)

*Abstract*

A computer version of a Handbook on radionuclide production cross sections in proton-induced nuclear reactions at intermediate energies issued by Springer Verlag Publishing House is presented.

The NUCLEX code (NUCLear reaction EXcitation functions) is an original computer version of the manyvolume Springer Handbook [1]. The latter represents a compilation of published experimental data on radionuclide production cross sections in hadron-induced nuclear reactions at intermediate energies. The NUCLEX code is intended to raise up the availability of this very complete data collection for specialists on pure and applied nuclear physics. It provides the efficiency of data searching, makes possible visual examination and comparison of data on the screen, puts at user's disposal some service means. Selected data can be stored on hard or floppy disk for further using. A simple updating procedure is foreseen to hold up the data collection in actual status. The NUCLEX code runs on the principle of menus and windows. The full size code requires about 2.5 Mb free space on a hard disk.

In the same manner as in the Handbook, the data on radionuclide production cross sections are presented in the form of excitation functions, i.e. as dependence of the formation cross section of the given radionuclide on a projectile energy for the given nucleus-target. The choice of the nucleus-target and radionuclide-product is performed visually, using a table of Mendeleev periodical system of chemical elements pictured on the screen together with some additional menus. Having chosen the excitation function of interest user can look it over on the screen in the form of a table of experimental values or in the graphic form as well as store the table in a text file for subsequent printout or any other using. Each excitation function is provided with the list of references on a basis of which it was constructed. User can also choose and store a set of several excitation functions.

Working on the excitation function in the graphic regime user can prescribe a linear or logarithmic scale along both energy and cross section axes. Several excitation functions can be pictured simultaneously for comparing study. Any selected graphic area of interest can be zoomed with rescaling as many times as is needed for detailed examination. Contents of the screen can be printed out using MS-DOS means with PrintScreen key.

User can look through on the screen and print out a total list of bibliographic sources for entire data collection or an arbitrary fragment of that. For user's convenience the reference data on the isotope abundances and decay periods can be displayed.

The present version NUCLEX 1.0 puts at user's disposal about 40000 experimental values of cross section on proton-induced reactions extracted from 630 original publications. This is the most complete compilation of such type today. In the forthcoming versions it is suggested, in particular, to include the data on reactions induced by deuterons, tritons,  $^3\text{He}$ -nuclei, alphas and, later on, by heavier projectiles.

## References

- [1] A.S.Iljinov, V.G.Semenov, M.P.Semenova, N.M.Sobolevsky, L.V.Udovenko. Production of Radionuclides at Intermediate Energies. Springer-Verlag, Landolt Boernstein/New Series, subvolumes I/13a(1991), I/13b(1992), I/13c(1993), and I/13d(1994).