

## Program RULER

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Language: FORTRAN-77  
Machine: DBC-10

### General

RULER is designed to calculate reduced transition probabilities from data contained in files conforming to legal ENSDF formats. It is primarily for use with ADOPTED LEVELS, GAMMAS data sets but will process any data set whose DSID indicates that gammas are present in the data set. There are two modes of operation. The first mode compares information calculated from the data with the recommended upper limits for gamma-ray strengths as given in Appendix D of BNL-NCS-51655. The second mode calculates  $BE\lambda W$  and  $BM\lambda W$  for  $L=1$  to 5 and produces a new data file containing these values if they differ from the data already in the file. Both modes produce a report file containing information on the data found and the calculations made. The calculations are based on the equations given in NS Memo 1B/1 (82) by M.J. Martin.

There is no limit as to the number of records, levels, or gammas contained in a data set. However, only 50 gammas may be associated with a given level and only 100 records may be associated with the level. If these limits are exceeded a warning message will be given and no calculations will be done for that level.

The program keeps track of limits and ranges for the various data involved in the calculations and attempts to give the correct limit or range on the  $BE\lambda W$  and  $BM\lambda W$  (NOTE: These portions of the program have not been thoroughly tested due to the many forms that ranges or limits may appear in. Currently, continuation records to the level record are scanned to obtain ranges or uncertainties on the half-life and to obtain %IT. The continuation records for gammas are scanned for ranges on the mixing ratio. Future versions will also scan for ranges on CC, RI, and TI. Numeric uncertainties are assumed to be standard deviations and are combined using standard techniques as described by Jay Orear in NOTES ON STATISTICS FOR PHYSICISTS, REVISED (CLNS 82/511, 1982).

To differentiate between the new continuation records created by RULER and those placed in the input file by the evaluator, the character "B" is used in column 6.

### String-Handling Subroutines and Functions

The FORTRAN-77 version of string-handling subprograms developed by L.P. Ekstrom and P. Andersson (LUNDFD6/NFFR-3049/1-27 (1983)) has been employed.

### Machine-Dependence

ANSI-standard FORTRAN 77 has been employed in an attempt to reduce the machine dependency of RULER. Known areas of machine dependency are in I/O specifications, terminal dialog, and time and date subprograms. This dependency is restricted to the subroutine OPBNFI which sets the I/O and performs the terminal dialog and the subroutine CLOCK which simulates a NORSE DATA D-500 routine. There is currently a PARAMETER statement at MAIN1630 which defines the machine.

### Sample Terminal Dialog

```
RULER --- Version 1.2 [13-Aug-84]
Input File Specifications==> DUMMY
Report File Specifications==> REPORT
Mode of Operation (R-Compare to RULs, B-Calculate BELW,BMLW)?R
```

Date and time will be given along with a warning that this is a preliminary version.

Current data set being processed will be displayed along with a note NO GAMMAS EXPECTED if the DSID indicates that there are no gammas.

```
RULER --- Version 1.2 [13-Aug-84]
Input File Specifications==> DUMMY
Report File Specifications==> REPORT
Mode of Operation (R-Compare to RULs, B-Calculate BELW,BMLW)?B
Output File Specifications==> NEW
```

Date and time will be given along with a warning that this is a preliminary version.

Current data set being processed will be displayed along with a note NO GAMMAS EXPECTED if the DSID indicates that there are no gammas.

The existence of the input file will be checked and if it does not exist, the user will be queried for a new name or if he wishes to exit. Similarly, if the output file already exists, the user will be given the option of overwriting the new file or providing a new name.

Description of Files Included on Tape

File 1	Source Code for RULBR
File 2	Source Code for necessary modules from FORTRAN 77 string handling library
File 3	Test Input
File 4	Sample Report for comparison to RUL's mode
File 5	Sample Report for calculating BELW,BMLW mode
File 6	Sample Output for calculating BELW,BMLW mode