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International Atomic Energy Agency

INDC(SEC)-24/L

INDC INTERNATIONAL NUCLEAR DATA COMMITTEE

RENDA 72 (Non-EANDC)

A Compilation of Requests for
Neutron Data Measurements for Reactors
from Non-EANDC Countries

April 1972

IAEA NUCLEAR DATA SECTION, KÄRNTNER RING 11, A-1010 VIENNA

LIST OF ELEMENTS

H	1	hydrogen	Kr	36	krypton	Lu	71	lutetium
He	2	helium	Rb	37	rubidium	Hf	72	hafnium
Li	3	lithium	Sr	38	strontium	Ta	73	tantalum
Be	4	beryllium	Y	39	yttrium	W	74	tungsten
B	5	boron	Zr	40	zirconium	Re	75	rhenium
C	6	carbon	Nb	41	niobium	Os	76	osmium
N	7	nitrogen	Mo	42	molybdenum	Ir	77	iridium
O	8	oxygen	Tc	43	technetium	Pt	78	platinum
F	9	fluorine	Ru	44	ruthenium	Au	79	gold
Ne	10	neon	Rh	45	rhodium	Hg	80	mercury
Na	11	sodium	Pd	46	palladium	Tl	81	thallium
Mg	12	magnesium	Ag	47	silver	Pb	82	lead
Al	13	aluminium	Cd	48	cadmium	Bi	83	bismuth
Si	14	silicon	In	49	indium	Po	84	polonium
P	15	phosphorus	Sn	50	tin	At	85	astatine
S	16	sulphur	Sb	51	antimony	Rn	86	radon
Cl	17	chlorine	Te	52	tellurium	Fr	87	francium
Ar	18	argon	I	53	iodine	Ra	88	radium
K	19	potassium	Xe	54	zenon	Ac	89	actinium
Ca	20	calcium	Cs	55	cesium	Th	90	thorium
Sc	21	scandium	Ba	56	barium	Pa	91	protactinium
Ti	22	titanium	La	57	lanthanum	U	92	uranium
V	23	vanadium	Ce	58	cerium	Np	93	neptunium
Cr	24	chromium	Pr	59	praseodymium	Pu	94	plutonium
Mn	25	manganese	Nd	60	neodymium	Am	95	americium
Fe	26	iron	Pm	61	promethium	Cm	96	curium
Co	27	cobalt	Sm	62	samarium	Bk	97	berkelium
Ni	28	nickel	Eu	63	europium	Cf	98	californium
Cu	29	copper	Gd	64	gadolinium	Es	99	einsteinium
Zn	30	zinc	Tb	65	terbium	Fm	100	fermium
Ga	31	gallium	Dy	66	dysprosium	Md	101	mendelevium
Ge	32	germanium	Ho	67	holmium	No	102	nobelium
As	33	arsenic	Er	68	erbium	Lw	103	lawrencium
Se	34	selenium	Tm	69	thulium	Ku	104	kurchatovium
Br	35	bromine	Yb	70	ytterbium			

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Contents

Preface

This report contains the current (as of April 1972) listing of RENDA* requests for neutron data measurements received by the IAEA* Nuclear Data Section (NDS) from countries in its service area and from the USSR; these countries do not belong to EANDC* and are therefore referred to as the Non-EANDC countries. The service area of NDS comprises Eastern Europe, Central and South America, Africa and the Middle East, Asia and the Far East (except Japan). This list supersedes the Draft Non-EANDC request list for neutron nuclear data measurements INDC*(NDS)-20/G of May 1970; it will form a part of the forthcoming world RENDA request list to be published in the fall of 1972.

The present document contains:

- a new list of 36 requests from the Soviet Union compiled and submitted to IAEA/NDS by M.N. Nikolaev from FEI Obninsk in May 1971 which supersedes all previous USSR requests contained in INDC(NDS)-20/G. Supporting documentation for the USSR requests is contained in INDC(CCP)-17/U and INDC(CCP)-19/U;

- unchanged requests from several Non-EANDC Member States of IAEA submitted to IAEA/NDS in 1969:

  Australia (16)
  Brazil (9)
  Bulgaria (6)
  East Germany (5)
  Pakistan (15)
  Finland (4)
  Hungary (12)
  India (8)
  South Africa (6)
  Taiwan (3)

- 16 new or updated requests from IAEA/NDS on the basis of NDS data reviews:

  a) Fast ^{239}Pu fission data; supporting document: INDC(NDS)-33/G and publication in Atomic Energy Review, both in preparation;

  b) Thermal fissile nuclides data; supporting document: Hanna et al., Atomic Energy Review 7 (1969), No.4, p.3.

The comments attached to the individual requests are composed of comments by the requestors and comments of EANDC topical reviewers to similar EANDC requests.

The cooperation of ENEA/NDCC* is acknowledged for operating the computer system and providing a printout of the Non-EANDC part of the complete RENDA file.

ENEA: European Nuclear Energy Agency, Paris
IAEA: International Atomic Energy Agency, Vienna
EANDC: European American Nuclear Data Committee
INDC: International Nuclear Data Committee

DESCRIPTION OF THE REQUESTS

In this listing each request is defined by the following quantities :

from left to right

1. Reference number

A serial number, the REFERENCE number, is attached to each entry of the listing sorted in ZAQ order. This number identifies an entry in one specific issue of RENDA only. (The number given in brackets below the reference number is of no use to the reader).

2. Target material

(a) elements (natural isotopic mixture) are described by the chemical symbol according to Table 1;

(b) separated isotopes are described by the chemical symbol and, for a specific nuclide, the atomic mass number;

(c) molecules or mixtures are described by a five-symbol abbreviation for the chemical composition, located in the columns usually reserved for the element symbol and the mass number.

The entries for these compound nuclei are given at the end of the listing.

3. Type of microscopic data (quantity)

All the quantities presently used, along with brief descriptions of the physical notion they represent, are listed in Table 2. The system for quantities follows the scheme used in CINDA, with a few additions to include neutron-producing reactions and information on nuclear structure.

4. Descriptive modifier to the quantity (Table 3)

Some of the quantities are rather comprehensive, and a specification of the request is needed in the "comment" section. The supplementary information is normally given on the line below the standard quantity assignment: in special cases this information is given in the "comment" section.

5. Energy Range

This section is intended primarily to display the minimum and the maximum value of the incident particle or photon energy. Each of the extreme limits is recorded in units of eV as a two-digit number (between 1.0 and 9.9) along with the exponent for the corresponding positive or negative power of 10 (positive exponent if energy is above 1 eV and negative if it is below). Thus:

2.4 + 6 is to be read 2.4×10^6 eV = 2.4 MeV

2.5 - 2 is to be read 2.5×10^{-2} eV = 0.025 eV

Where only one energy is involved, such as the energy of a resonance, it is put in the E_{min} columns, and the E_{max} space is left blank. Where, as in resonance integrals, there is no upper bound, E_{min} gives the low energy limits of the integral. (If, on the contrary, E_{min} is left blank, the E_{max} notation should be interpreted as "up to the E_{max} value given".) An exponent with a mantissa left blank indicated the order of magnitude of energy, e.g. .. + 3 is to be read "keV energies" or the "keV region".

A limited number of alphabetic abbreviations can be used in special cases, for example for a continuous spectrum of incident neutron energies. The only presently accepted abbreviations are:

Printout	Description
COLD	below thermal
THR	thermal, normally when measured or corrected to a Maxwellian distribution characteristic of 293°K. Variations may be indicated in the "comments" section
PILE	pile spectrum (depends on source)
RES	resonance region
FISS	fission spectrum, normally U235 fissioned by thermal neutrons
TR	threshold or from threshold up to some energy specified in the E_{max} column or the comments section
SPON	spontaneous (or fission)

6. Accuracy Requirements

The accuracy is given in per cent and tenths of per cent relative to the value measured. Thus:

10	is to be read 10%
1.5	is to be read 1.5%
< 5	is to be read "better than 5%"

In the entries made up to the December 1968 edition of RENDA, the following special cases should be noted.

(1) If the original request quotes a range of desired accuracy, e.g. 5 to 10%, the notation "better than" the highest figure is given in the "Accuracy" column (e.g. < 10%) and the range given in the "Comments" section.

(2) If the original request gives many indications of the desired accuracy, e.g. for different parts of the energy range covered, no figure is given in this section and the details are given in the "Comments" section.

(3) The accuracy requirements for U.K. requests are given in §12. A specific notation used in UK requests should be noted, viz. (E - κE) where κ in general equals 1.5 or 2, quoted along with a percentage error. For these requests the uncertainty represents the mean error over the range indicated (from E to κE).

In the new programmes the feature of supplementary information in the "accuracy" column has been included and up to five extra "words" of eight characters can be introduced. This gives the possibility to state precisely the information on accuracy that defines the request, and in most practical cases should be sufficient for the above three situations.

7. Priority Assignment

Three priorities, noted 1, 2 and 3 (1 being the highest), can be attributed to the requests. The priorities are defined as follows:

Priority 1

Nuclear data which satisfy the criteria of Priority 2 and which have been selected for maximum practicable attention, taking into account the urgency of nuclear energy programme requirements.

For example, the European American Committee for Reactor Physics assigns its highest priorities for reactor measurements as follows:

"The highest priority should be given to requests for nuclear data for reactors to be built in the near future if:

a. These data are still necessary to predict the different reactor properties after all information from integral experiments and operating reactors has been used;
or
b. information on an important reactor parameter is in principle attainable through mathematical calculation from nuclear data only;
or
c. these data are needed for materials required in reactor physics measurements."

Priority 2

Nuclear data which will be required during the next few years in the applied nuclear energy programme (e.g. the design of a reactor or fuel processing plant; data needed for optimum use of reactor fuel and construction materials such as neutron moderators, absorbers and radiation shields; space application and biomedical studies; data required for better understanding of some significant aspect of reactor behaviour).

Priority 3

Nuclear data of more general interest and data required to fill out the body of information needed for nuclear technology.

Note: The priority quoted in the "Priority" column is that of the original request (see list of sources in the present compilation). In some cases, comments give further information on priority assignment.

8. Laboratory, institution (Table 4)

On the first line of a request, the laboratory or institution of the requester(s) is given in the LAB column. The abbreviations are explained in Table 4 (alphabetic order of abbreviations). The name of the requester is given in the "Comments" section immediately following the abbreviation of his laboratory or institution.

The separation between requesters' and measurers' comments (see "Comments" section) is indicated in the LAB column by the sign ---. Laboratory indications below this sign refer to work completed, in progress or planned according to the comment text following.

9. Requesters, measurers

The names of requesters are printed at the beginning of the comments section and adjacent to the corresponding laboratory abbreviation in the LAB column. The names of experimentalists are similarly entered in the comment field in connection to LAB entries below the separation line --- (see section 8) in the LAB column. This procedure makes the names form part of the fixed format information, which can subsequently be retrieved.

10. Date of request

The year of origin of a request is indicated (when given) at the end of the first line of a request.

11. Comments

This section includes :

I. (a) comments and specifications on the quantity requested;

(b) comments and specifications on the accuracy requested;

(c) comments on the experimental conditions, e.g. calibration, resolution of incident particle and in method of detection, etc.;

(d) the motivation of the request;

(e) other comments from requesters (for instance, modifications of request in relation to latest issue of the list).

II. (a) remarks on existing work;

(b) remarks on forthcoming work;

(c) remarks on the status of the request.

(The laboratory indications are given in the associated LAB column space).

Sections I and II and separated by the indication ___ in the LAB column. The laboratory abbreviations are listed in Table 4. The reference abbreviations (journals, reports) are in general those commonly used for citation in scientific literature. The CINDA reference abbreviations are given in Table 6. A few frequently-used references to conferences on nuclear data might, however, be mentioned :

3rd Conference, Geneva 1964	Proceedings of the 3rd International Conference on the Peaceful Uses of Atomic Energy, Geneva, May 1964
Symposium, Salzburg 1965, or SM/ (contribution number)	Proceedings of the IAEA Symposium on the Physics and Chemistry of Fission, Salzburg, March 1965
Conference, Antwerp 1965	Proceedings of the International Conference on the Study of Nuclear Structure with Neutrons, Antwerp, July 1965
Conference, Washington 1966 or Conference 660303	Proceedings of the Conference on Neutron Cross Sections and Technology, Washington, March 1966
Conference, Paris 1966 , or CN/(contribution number)	Proceedings of the IAEA Conference on Nuclear Data - Microscopic Cross Sections and Other Data Basic for Reactors, Paris, October 1966
Conference, Washington 1968	Proceedings of the Conference on Neutron Cross Sections and Technology, Washington, March 1968

REF (REG)	NUCLIDE	QUANTITY	ENERGY (EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
1 (2442+)	^{1}H	N,GAMMA	THR		0.3	2	IAE	Lemmel, H.D. Absolute measurement of cross section required in context of 2200 m/s fission constants evaluation. Recent existing data are discrepant by 3.5%, although better accuracy is claimed for individual data.	69
2 (2443+)	H	THRMLSCATLAW	0. +0	1.0-1		2	HLT	Tunkelo, E. Scattering law for solid and liquid hydrogen wanted, both for ortho and para. For design of refrigerated neutron source.	69
3 (2444+)	^{3}He	N,PROTON	1.0+5	1.0+7	< 5.0	1	TRM	Navalkar, M.P. For neutron spectrum measurements with sandwiched He^{3} spectrometer. Present knowledge is about 10% and worse.	71
							GA	Costello reviewed status at EANDC Standards Symposium, Argonne, October 1970, Proc. p.74.	
4 (2445+)	^{6}Li	N,ALPHA	1.0+5	1.0+7	< 5.0	1	TRM	Navalkar, M.P. For neutron spectrum measurements with sandwiched Li^{6} spectrometer. Present knowledge is about 10% and worse.	71
							HAR	Uttley et al. reviewed status at EANDC Standards Symposium, Argonne, October 1970, Proc. p.80.	
5 (2446+)	^{14}N	N2N XSECTION	1.4+7		10.0	3	KOS	Csikai, J. Needed for neutron activation analysis and cross section systematics. Incident energy resolution 200 keV. For reference see At.En.Rev.7(1969),93.	69
6 (2447+)	^{16}O	N,PROTON	1.4+7		10.0	3	KOS	Csikai, J. Needed for neutron activation analysis and cross section systematics. Incident energy resolution 200 keV. For reference see At.En.Rev.7(1969),93.	69
7 (2448+)	^{19}F	N2N XSECTION	1.4+7		10.0	3	KOS	Csikai, J. Needed for neutron activation analysis and cross section systematics. Incident energy resolution 200 keV. For reference see At.En.Rev.7(1969),93.	69
8 (2449+)	^{23}Na	N,GAMMA (res.param)	1.0+2	6.5+4	10.0	2	AUA	Symonds, J.L. Neutron and capture widths and J for 2.85 keV resonance wanted. Available information on capture width inconsistent. Also parameters for 35 keV resonance wanted.	69
							RPI	Hockenbury et al. give revised capture width value of 0.45 eV in PR 178(1969),1746.	
							GA	Friesenhahn et al. report capture width of 0.34 eV at Washington Conference 1968 compatible with thermal cross section and resonance integral.	
							COL	Camarda et al.,analysis to be done, WASH-1136, 28.	
9 (2450+)	Na	N,GAMMA see comment	THR	4.0+3	<10	1	FEI	Nikolaev, M.N. For fast reactor Keff and BR calculation and evaluation of Na activation. Capture width of 2.9 keV resonance should be measured in three different experiments, results should coincide within limits of 5-7%. If high RPI capture width confirmed, energy dependence of capture CS should be measured from thermal to resonance region to investigate interference between direct and resonance capture. Measurements of gamma ray spectra in thermal and first resonance regions desirable for decision about existence of interference effects.	71
							RPI	Hockenbury et al. give revised capture width value of 0.45 eV in PR 178(1969),1746.	
							GA	Friesenhahn et al. report capture width of 0.34 eV at Washington Conference 1968 compatible with thermal cross section and resonance integral.	
							COL	Camarda et al., analysis to be done, WASH-1136, 28.	

REF (REG)	NUCLIDE	QUANTITY	ENERGY (EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
10 (2451+)	Na	RESON PARAMS see comment	2.9+3	1.0+5		1	FEI	Nikolaev, M. N. For fast reactor calculation. Neutron widths wanted for 2.9 keV resonance with 5% accuracy, for other 5 resonances with 10% accuracy, capture widths with 10% accuracy.	71
							IAE	Available data do not satisfy accuracy requirements.	
							COL	Camarda et al.,analysis to be done, WASH-1136, 28.	
11 (2452+)	^{27}Al	DIFF ELASTIC	1.0+3	5.0+6	10.0	2	PEL	De Beer, G. P. For shielding calculations.	69
							AE	Holmqvist measured at 2.5-8.0 MeV, AF 38 (1969),403.	
12 (2453+)	^{27}Al	DIFF INELAST energy,angle	TR	5.0+6	10.0	2	PEL	De Beer, G.P. For shielding calculations.	69
							AE	Almen et al. measured level excitation CS at 2.0-4.5 MeV, AIEA CN-26/56.	
13 (2454+)	^{27}Al	NONEL GAMMAS energy,angle	TR	5.0+6	10.0	2	PEL	De Beer, G.P. For shielding calculations.	69
							GA	Orphan et al. measured at 0.85-16 MeV, WASH-1155 ,p.66.	
14 (2455+)	^{35}Cl	NONEL GAMMAS see comment	+			3	IEN	Aghina, L.O.B. Gamma spectra between resonances wanted. Special interest on interference and direct capture.	69
15 (2456+)	^{40}Ar	N,PROTON	1.4+7		10.0	3	KOS	Csikai, J. Needed for neutron activation analysis and cross section systematics. Incident energy resolution 200 keV. For reference see At.En.Rev.7(1969),93.	69
16 (2457+)	^{41}K	N,PROTON	1.4+7		10.0	3	KOS	Csikai, J. Needed for neutron activation analysis and cross section systematics. Incident energy resolution 200 keV. For reference see At.En.Rev.7(1969),93.	69
17 (2458+)	Ti	N,GAMMA	1.0+4	1.0+5	20	2	AUA	Symonds, J. L. Available data not satisfactory.	69
							AUA	Bird, AAEC ,is studying this.	
							ORL	Allen et al. measured at 30 keV - 3 MeV, analysis to be completed, NCSAC-33 ,171.	
18 (2459+)	^{55}Mn	NONEL GAMMAS see comment	+			3	IEN	Aghina, L.O.B. Gamma spectra between resonances wanted. Special interest on interference and direct capture.	69
19 (2460+)	^{55}Mn	N,GAMMA (res.param)	3.3+2		2.0	2	AUA	Symonds, J.L. Capture width with 2% accuracy desired for monitor.	69
							AUA	Stroud has work in progress to 5%.	
20 (2461+)	^{56}Fe	NONEL GAMMAS see comment	+			3	IEN	Aghina, L.O.B. Gamma spectra between resonances wanted. Special interest on interference and direct capture.	69
21 (2462+)	Fe	N,GAMMA ratio x-sect	5.0+2	5.0+5	10	1	FEI	Nikolaev, M.N. For fast reactor BR prediction with 1.6% accuracy. Self-shielding of capture cross section must be known. For this resonance parameters including capture widths of all strong s wave resonances must be determined. Contribution of majority of p wave and narrow s wave resonances to average CS is sufficient to know. All measurements wanted relative to fission CS of U^{235}.	71
							HAR	Evaluation in progress indicates 20% uncertainty below 100 keV.	
							ORL	Macklin and Gibbons measured 125-182 keV, PR 159 (1967),1007, 25% accuracy.	
							HAR	Moxon (Antwerp Conf. 1965) measured 1-100keV. Accuracy should be improved.	
							RPI	Hockenbury et al., PR 178(1969),1746, published high resolution data 1-200 keV, 1 capture width (at 27.8 keV) , many capture areas.	
							KFK	Ernst et al. have high resolution data 7-200 keV, capture width at 27.8 keV, AIEA CN-26/11. Measurement on Fe^{54} in progress.	

REF (REG)	NUCLIDE	QUANTITY	ENERGY (EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
22 (2463+)	Fe	TOTAL XSECT	1.0+4	1.0+5	5.0	1	FEI	Nikolaev, M.N. For prediction of fast reactor BR with 1.6% accuracy. Careful measurements of interference minima needed.	71
							COL	Garg et al. measured total CS up to 200 keV and made multilevel analysis, Bull.Am.Phys.Soc.13(1968),1389.	
23 (2464+)	Fe	DIFF INELAST energy dist	1.4+6	1.5+7	5.0	1	FEI	Nikolaev, M. N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. CS for inelastic removal below fission threshold of U^{238} wanted with 5% accuracy. Level excitation CS desired with 10% accuracy. In continuum region energy dependence of nuclear temperature wanted.	71
							ORL	Perey et al. measured at 4.2-8.6 MeV, ORNL 4515.	
							WRU	Lindow et al. measured at 5.1-5.6 MeV, EANDC(US)-143U, p.31.	
							TNC	Buchanan et al. have data at 11 MeV, EANDC(US)-143U, p.214.	
							ANL	Smith et al., NP A118 ,321.	
24 (2465+)	^{59}Co	N,GAMMA (res.param)	1.3+2		2.0	2	AUA	Symonds, J. L. Capture width with 2% accuracy desired for monitor.	69
							AUA	Wall and Stroud - Montreal Conf.August 1969 - give capture width to 10%. Stroud redoing to 5%.	
25 (2466+)	^{60}Co	NONEL GAMMAS see comment	+			3	IEN	Aghina, L.O.B. Gamma spectra between resonances wanted. Special interest on interference and direct capture.	69
26 (2467+)	^{58}Ni	N,ALPHA	0. +0	1.0+6	20	2	ITK	Mehta, G. K. No data available.	69
27 (2468+)	^{64}Zn	N2N XSECTION	1.4+7		10.0	3	KOS	Csikai, J. Needed for neutron activation analysis and cross section systematics. Incident energy resolution 200 keV. For reference see At.En.Rev.7(1969),93.	69
28 (2469+)	^{69}Ga	N2N XSECTION	1.4+7		10.0	3	KOS	Csikai, J. Needed for neutron activation analysis and cross section systematics. Incident energy resolution 200 keV. For reference see At.En.Rev.7(1969),93.	69
29 (2470+)	Zr	RESON PARAMS	0. +0	1.0+4	10	2	HLT	Saastamoinen, J. For reactivity effects.	69
							SAC	Morgenstern et al., NP A123(1969), 561.	
							RPI	Bartolome, NSE 37(1969),137.	
							ORL	Good and Kim, PR 165(1968),1329.	
							HAR	Rae: neutron widths known to 10-15%, problem lies mainly in capture widths, EANDC(UK)-131.	
30 (2471+)	^{96}Mo	N,GAMMA (res.param)	1.0+4	1.0+5	10.0	2	AUA	Symonds, J. L. P wave strength function for fission product calculations and astrophysics.	69
31 (2472+)	^{107}Ag	N,ALPHA	THR		10.0	3	KOS	Csikai, J. For neutron activation analysis and cross section systematics wanted.	69
							IAE	No measurements available.	
32 (2473+)	^{110}Cd	N,GAMMA (res.param)	1.0+4	1.0+5	10.0	2	AUA	Symonds, J.L. P wave strength function for fission product calculations and astrophysics.	69
33 (2474+)	^{136}Ba	N,GAMMA (res.param)	1.0+4	1.0+5	10.0	2	AUA	Symonds, J. L. P and d wave strength functions for fission product calculations and astrophysics.	69
34 (2475+)	^{144}Sm	N2N XSECTION	1.4+7		10.0	3	KOS	Csikai, J. Needed for neutron activation analysis and cross section systematics. Incident energy resolution 200 keV. For reference see At.En.Rev.7(1969),93.	69

REF (REG)	NUCLIDE	QUANTITY	ENERGY (EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
35 (2476+)	^{151}Eu	ACTIVATION	0. +0	1.0+0	5.0	2	BUL	Christov, V. For activation detectors for thermal neutron flux determination.	69
							MOL	Poortmans measured: expected accuracy of shape <3%; absolute accuracy of 5% at 20 meV - 0.6 eV. Isomeric ratio of bound level (and parameters) and of first two resonances determined, EANDC(E)-115U, 188. When analysis complete, request probably fulfilled.	
36 (2477+)	^{151}Eu	RES INT ACT	0. +0	1.0+0	5.0	2	BUL	Christov, V. For activation detectors for thermal neutron flux determination.	69
37 (2478+)	^{151}Eu	ACTIVATION	1.0-3	1.0+1	5.0	2	ROS	Albert, D. Cross section data needed for evaluation of measured activation rates by means of foils (especially spectral indices) for thermal neutron fluxes.	69
							MOL	Poortmans measured: expected accuracy of shape <3%; absolute accuracy of 5% at 20 meV - 0.6 eV. Isomeric ratio of bound level (and parameters) and of first two resonances determined, EANDC(E)-115U, 188. When analysis complete, request probably fulfilled.	
38 (2479+)	^{151}Eu	RES INT ACT	THR	1.0+4	5.0	2	ROS	Albert, D. Cross section data needed for evaluation of measured activation rates by means of foils (especially spectral indices) for thermal neutron fluxes.	69
39 (2480+)	^{164}Dy	N,GAMMA	1.0-3	1.0+1	5.0	2	ROS	Albert, D. Cross section data needed for evaluation of measured activation rates by means of foils (especially spectral indices) for thermal neutron fluxes.	69
							IFU	Vertebny measured 0.01 - 10 eV, AIEA CN-26/87.	
40 (2481+)	^{168}Er	N,ALPHA	THR		10.0	3	KOS	Csikai, J. For neutron activation analysis and cross section systematics wanted.	69
							CCP	Ionisation chamber measurement available from Andreev, YF 1(1965),252.	
41 (2482+)	^{168}Yb	ACTIVATION	0. +0	1.0+0	5.0	2	BUL	Christov, V. For activation detectors for thermal neutron flux determination.	69
42 (2483+)	^{168}Yb	RES INT ACT	0. +0	1.0+0	5.0	2	BUL	Christov, V. For activation detectors for thermal neutron flux determination.	69
							CNE	Ricabarra measured, AIEA CN-26/1.	
43 (2484+)	^{176}Lu	N,GAMMA	1.0-3	1.0+1	5.0	2	ROS	Albert, D. Cross section data needed for evaluation of measured activation rates by means of foils (especially spectral indices) for thermal neutron fluxes.	69
44 (2485+)	^{176}Lu	RES INT ACT	THR	1.0+4	5.0	2	ROS	Albert, D. Cross section data needed for evaluation of measured activation rates by means of foils (especially spectral indices) for thermal neutron fluxes.	69
45 (2486+)	^{176}Lu	ACTIVATION	0. +0	1.0+0	5.0	2	BUL	Christov, V. For activation detectors for thermal neutron flux determination.	69
46 (2487+)	^{176}Lu	RES INT ACT	0. +0	1.0+0	5.0	2	BUL	Christov, V. For activation detectors for thermal neutron flux determination.	69
47 (2488+)	^{179}Hf	N,GAMMA	THR	1.0+1	5.0	2	CHP	Chien, J.P. Capture reaction leading to Hf^{180} metastable state at 1.143 MeV with 5.5 h half life required. No measurements available. Needed for reactor control rod design.	69

REF (REG)	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER, COMMENTS	YEAR
48 (2489+)	^{180}Hf	DIFF INELAST angular dist see comment	1.0+5	2.0+6	20	2	CHF	Chien, J.P. Diff. inelastic scattering CS of Hf^{180} metastable (n,n') as function of energy of scattered neutron wanted. No measurements available. Needed for neutron conversion experiment (to convert thermal into fast neutrons). 10-30% Accuracy required.	
49 (2490+)	^{180}Hf	DIFF INELAST energy dist	1.0+5	2.0+6	20	2	CHF	Chien, J.P. No measurements available. Wanted for reactor design. 10-30% Accuracy required.	
50 (2491+)	^{182}W	N,ALPHA	THR		10.0	3	KOS	Csikai, J. For neutron activation analysis and cross section systematics wanted. No measurements available.	69
51 (2492+)	^{186}Os	N,ALPHA	THR		10.0	3	KOS ___ CCP	Csikai, J. For neutron activation analysis and cross section systematics wanted. Ionisation chamber measurement available from Andreev, YF 1(1965),252.	69
52 (2493+)	^{197}Au	NONEL GAMMAS see comment	+			3	IEN	Aghina, L.O.B. Gamma spectra between resonances wanted. Special interest on interference and direct capture.	69
53 (2494+)	^{197}Au	RESON PARAMS	+	2.0+3		3	IEN ___ SAC	Aghina, L.O.B. Special interest in the ratio of s wave strength functions S(J=1)/S(J=2) and its variation as a function of the energy interval. Extensive results available from Saclay LINAC measurements up to 3 keV, CEA-R-3385,1968; NP A131(1969), 450.	69
54 (2495+)	^{198}Hg	NONEL GAMMAS see comment	+			3	IEN	Aghina, L.O.B. Gamma spectra between resonances wanted. Special interest on interference and direct capture.	69
55 (2496+)	^{200}Hg	NONEL GAMMAS see comment	+			3	IEN	Aghina, L.O.B. Gamma spectra between resonances wanted. Special interest on interference and direct capture.	69
56 (2497+)	^{201}Hg	NONEL GAMMAS see comment	+			3	IEN	Aghina, L.O.B. Gamma spectra between resonances wanted. Special interest on interference and direct capture.	69
57 (2498+)	^{233}U	MISCELLANEOS see comment	+		0.2	2	IAE	Lemmel, H.D. Alpha half-life required for 2200 m/s fission constants. Recent data are discrepant by 4.5%,although better accuracy is claimed for individual data.	69
58 (2499+)	^{233}U	SPECT FISS N see comment	THR		1.0	1	IAE	Lemmel, H.D. Mean spectrum energy with 1% accuracy plus spectrum shape requested for calibration of nu-bar measurements. Absolute or relative to other fissile isotopes wanted.	69
59 (2500+)	^{233}U	FISSION	2.0+4	2.0+6	3.0	2	ITK ___ KFK	Mehta, G.K. Cross section required at 60, 150, 200, 500 keV and 1 MeV with energy resolution of 5%. Pfletschinger and Kaeppeler measured fission CS ratio U^{233} / U^{235} at 5 keV - 1 MeV with 2-3% accuracy.	69
60 (2501+)	^{233}U	FRAG NEUTRNS see comment	5.0+4	1.0+6	10.0	2	ITK	Mehta, G.K. Prompt neutrons as function of fprod mass wanted.	69
61 (2502+)	^{233}U	NU	THR	1.0+7	1.0	2	AUA ___ ANL IAE	Symonds, J.L. Available data not satisfactory. Evaluation by Davey, NSE 44(1971), 345. Manero and Konshin, evaluation in progress.	69
62 (2503+)	^{235}U	SPECT FISS N see comment	THR		1.0	1	IAE	Lemmel, H.D. Mean spectrum energy with 1% accuracy plus spectrum shape requested for calibration of nu-bar measurements. Absolute or relative to other fissile isotopes wanted.	69

REF (REG)	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
63 (2504+)	^{235}U	FISSION	1.0+0	5.0+6	5.0	2	UPR	Koen, J. For calculations of pulsed heterogeneous systems.	69
							ANL	Poenitz reports new results 500 - 700 keV using V^{51}(p,n), EANDC(US)-143-U.	
							LRL	Czirr is measuring fission and capture 50 eV - 28 keV , EANDC(US)-143-U.	
							LRL	Bowman has relative measurements 1.5 - 500 keV. EANDC(US)-143-U.	
							LAS	Keyworth has data from Physics 8 event 30 eV to 100 keV.	
							LAS	Barton et al. are planning measurements relative to hydrogen 2 - 20 MeV.	
							SAC	Blons et al. have data 17 eV to 30 keV. AIEA CN-26/60.	
							CAD	Szabo et al. have data 25 keV to 1 MeV, absolute accuracy ±3%. AIEA CN-26/69.	
							HAR	Evaluation of existing data in progress above 100 eV. See Sowerby and Patrick AIEA CN-26/34.	
64 (2505+)	^{235}U	DIFF INELAST energy,angle	3.0+5	1.0+7	10	1	RAM	Islam, M.M. For fast reactors.	69
							GEL	Coppola and Knitter have data at 1.5, 1.9 and 2.3 MeV.	
							ANL	Smith has data to 1.5 MeV.	
							HAR	Ferguson measured 0.13-1.5 MeV, AIEA CN-23/22.	
65 (2506+)	^{235}U	INELASTGAMMA energy,angle	3.0+5	4.0+6	10	1	RAM	Islam, M.M. For fast reactors.	69
66 (2507+)	^{235}U	NONELASTIC	1.0+5	1.0+7	10	2	RAM	Islam, M.M. For fast reactors.	69
							IAE	No recent measurements.	
67 (2508+)	^{235}U	FISSION	THR	1.5+7	5.0	1	RAM	Islam, M.M. For fast reactors.	69
							ANL	Poenitz reports new results 500 - 700 keV using V^{51}(p,n), EANDC(US)-143-U.	
							LRL	Czirr is measuring fission and capture 50 eV - 28 keV , EANDC(US)-143-U.	
							LRL	Bowman has relative measurements 1.5 - 500 keV. EANDC(US)-143-U.	
							LAS	Keyworth has data from Physics 8 event 30 eV to 100 keV.	
							LAS	Barton et al. are planning measurements relative to hydrogen 2 - 20 MeV.	
							SAC	Blons et al. have data 17 eV to 30 keV. AIEA CN-26/60.	
							CAD	Szabo et al. have data 25 keV to 1 MeV, absolute accuracy ±3%. AIEA CN-26/69.	
							HAR	Evaluation of existing data in progress above 100 eV. See Sowerby and Patrick AIEA CN-26/34.	
68 (2509+)	^{235}U	N,GAMMA	THR	3.0+4	3.0	2	RAM	Islam, M.M. For fast reactors.	69
							LRL	Czirr is measuring alpha 50 eV - 28 keV, EANDC(US)-143U.	
69 (2510+)	^{235}U	FISSION	2.0+4	2.0+6	3.0	2	ITK	Mehta, G.K. Cross section required at 60, 150, 200, 500 keV and 1 MeV with energy resolution of 5%.	69
							ANL	Poenitz reports new results 500 - 700 keV using V^{51}(p,n), EANDC(US)-143-U.	
							LRL	Czirr is measuring fission and capture 50 eV - 28 keV , EANDC(US)-143-U.	
							LRL	Bowman has relative measurements 1.5 - 500 keV. EANDC(US)-143-U.	
							LAS	Keyworth has data from Physics 8 event 30 eV to 100 keV.	
							LAS	Barton et al. are planning measurements relative to hydrogen 2 - 20 MeV.	
							SAC	Blons et al. have data 17 eV to 30 keV. AIEA CN-26/60.	
							CAD	Szabo et al. have data 25 keV to 1 MeV, absolute accuracy ±3%. AIEA CN-26/69.	
							HAR	Evaluation of existing data in progress above 100 eV. See Sowerby and Patrick AIEA CN-26/34.	

REF (REG)	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
70 (2511+)	^{235}U	FRAG NEUTRNS see comment	5.0+4	1.0+6	10.0	2	ITK	Mehta, G. K. Prompt neutrons as function of fprod mass wanted.	69
71 (2512+)	^{235}U	NU	THR	1.0+7	1.0	2	AUA	Symonds, J. L. Still inconsistencies in available data.	69
							HAR	Colvin reviewed status before Helsinki Conference, AIEA CN-26/99.	
							ANL	Evaluation by Davey, NSE 44 (1971), 345.	
							IAE	Manero and Konshin, evaluation in progress.	
72 (2513+)	^{235}U	DIFF INELAST energy dist	TR	1.5+7		1	FEI	Nikolaev, M. N. For 1.0 % accuracy in Keff of U^{235} fuelled fast converters. CS for inelastic removal below fission thresholds of U^{238} (7% acc.y) and of Pu^{240} (or Np^{237} (10% acc.y) wanted. Excitation CS for low lying levels requested with 15% accuracy.	71
							GEL	Coppola and Knitter have data at 1.5, 1.9 and 2.3 MeV.	
							ANL	Smith has data to 1.5 MeV.	
							HAR	Ferguson measured 0.13-1.5 MeV, AIEA CN-23/22.	
73 (2514+)	^{235}U	ALPHA	1.0+2	8.0+5	7.0	1	FEI	Nikolaev, M. N. For accuracy of 1.5 % in conversion ratio for U^{235}-oxide fuelled fast converters. Also needed for comparison with alpha- Pu^{239} for test of measurement methods. In region 1-100 keV better accuracy desirable (about 5%). For evaluation of differences in capture and fission resonance selfshielding, measurements of transmission curves by self-detection method with capture or absorption detectors very desirable. Beam attenuation down to 1% wanted. At least three different results must coincide within requested accuracy.	71
							LRL	Czirr is measuring alpha 50 eV - 28 keV, EANDC(US)-143U.	
74 (2515+)	^{235}U	FISSION see comment	5.0+3	7.0+6	3.0	1	FEI	Nikolaev, M. N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Accuracy determined by use of this CS as standard in fission and capture measurements for other isotopes. If capture CS would be measured absolutely and fission CS for Pu^{239} and U^{238} relative to the fission CS of U^{235}, then requested accuracy for the latter would be about 2 %. Below 20 keV measurements of transmission curves by flat response detector and by self detection method with fission detector wanted for selfshielding evaluation. These curves must be measured with attenuations of the primary beam down to 1 %. Best accuracy of 1.5 % desirable in 1.2 to 2.5 MeV region because of U^{238} fission CS normalisation. Request considered fulfilled, when at least three measurements with different methods agree within requested accuracy.	71
							ANL	Poenitz reports new results 500 - 700 keV using V^{51}(p,n), EANDC(US)-143-U.	
							LRL	Czirr is measuring fission and capture 50 eV - 28 keV , EANDC(US)-143-U.	
							LRL	Bowman has relative measurements 1.5 - 500 keV. EANDC(US)-143-U.	
							LAS	Keyworth has data from Physics 8 event 30 eV to 100 keV.	
							LAS	Barton et al. are planning measurements relative to hydrogen 2 - 20 MeV.	
							SAC	Blons et al. have data 17 eV to 30 keV. AIEA CN-26/60.	
							CAD	Szabo et al. have data 25 keV to 1 MeV, absolute accuracy ±3%. AIEA CN-26/69.	
							HAR	Evaluation of existing data in progress above 100 eV. See Sowerby and Patrick AIEA CN-26/34.	

REF (REG)	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
75 (2516+)	^{235}U	NU see comment	THR	2.5+6	0.5	1	FEI	Nikolaev, M. N. For accuracies of 1.0 % in Keff and 1.5 % in conversion ratio for fast U^{235} fuelled converters. 0.5 % accuracy required for measurement of ratio nu U^{235} to nu Cf^{252}. Energy dependence of nu is wanted with 0.7 % accuracy and 10 % energy resolution in the region below 2.5 MeV.	71
							HAR	Colvin reviewed status before Helsinki Conference, AIEA CN-26/99.	
							ANL	Evaluation by Davey, NSE 44(1971), 345.	
							IAE	Manero and Konshin, evaluation in progress.	
76 (2517+)	^{235}U	NU see comment	THR	2.5+6	0.1	2	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.5 % in conversion ratio for fast U^{235} fuelled converters. 0.1 % accuracy required for measurement of ratio nu U^{235} to nu Cf^{252}, evaluated from optimum distribution of uncertainties over uncorrelated nuclear data.	71
							HAR	Colvin reviewed status before Helsinki Conference, AIEA CN-26/99.	
							ANL	Evaluation by Davey, NSE 44(1971), 345.	
							IAE	Manero and Konshin, evaluation in progress.	
77 (2518+)	^{236}U	NU	TR	5.0+6	1.0	1	FEI	Nikolaev, M.N. For calculation of fast U^{235} fuelled converters.	71
							ANL	Evaluation by Davey, NSE 44(1971), 345.	
							FOA	Holmberg and Conde, work in progress at 0.8-6.5 MeV, EANDC(OR)-99L.	
							IAE	Manero and Konshin, evaluation in progress.	
78 (2519+)	^{236}U	FISSION ratio x-sect	1.0+5	5.0+6	5.0	1	FEI	Nikolaev, M.N. For calculation of fast U^{235} fuelled converters. Relative to U^{235} fission CS wanted.	71
							LAS	Auchampaugh has fission data from Physics 8 event.	
							LAS	Mc Nally has fission data from Physics 7 event at 0.1 to 2 MeV, EANDC(US)-143U.	
							KFK	Hinkelmann evaluation, AIEA CN-26/15 ,and KFK 1186 (EANDC(E)-128U), 1970.	
79 (2520+)	^{236}U	N,GAMMA ratio x-sect	5.0+2	1.4+6	7.0	1	FEI	Nikolaev, M.N. For calculation of fast U^{235} fuelled converters. Relative to U^{235} fission CS wanted.	71
							GA	Carlson et al. measured at 0-20 keV, NP A141, 577.	
80 (2521+)	^{236}U	RESON PARAMS see comment	1.0+1	5.0+3		1	FEI	Nikolaev, M.N. For calculation of fast U^{235} fuelled converters. Neutron and capture widths wanted for evaluation of selfshielding in resolved resonance region. Average s and p wave resonance parameters should be derived. Statistical analysis of measured res. par. wanted.	71
							KFK	Hinkelmann evaluated average resonance parameters, AIEA CN-26/15 ,and KFK 1186 (EANDC(E)-128U), 1970.	
							MTR	Harlan measured total CS 5.5-380 eV and gives neutron widths for 13 resonances, WASH 1127,p.60.	
							GA	Carlson et al. give neutron and capture widths up to 1 keV, NP A141, 577.	
81 (2522+)	^{236}U	DIFF INELAST energy dist	TR	5.0+6	10	1	FEI	Nikolaev, M. N. For calculation of fast U^{235} fuelled converters. CS for inelastic removal below fission thresholds of U^{236} and U^{238} wanted with 10% accuracy.	71
							IAE	No experimental data available.	
82 (2523+)	^{238}U	FISSION	TR	6.0+6	5.0	2	UPR	Koen, J. For calculations of pulsed heterogeneous systems.	69
							ANL	Meadows has results below 1.5 MeV, EANDC(US)-143U.	
83 (2524+)	^{238}U	FISSION	TR	1.5+7	5.0	1	RAM	Islam, M.M. For fast reactors.	69
							ANL	Meadows has results below 1.5 MeV, EANDC(US)-143U.	

REF (REG)	NUCLIDE	QUANTITY	ENERGY (EV) MIN	ENERGY (EV) MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
84 (2525+)	^{238}U	N,GAMMA	THR	3.0+4	3.0	2	RAM	Islam, M.M. For fast reactors.	69
							ANL	Davey, NSE 39(1970),337, reviews status before Helsinki Conference above resonance range. Several relevant papers at Hels. Conf. (CN-26/18, 43,77, 78, 111).	
							COL	Arbo et al. plan low keV TOF measurement (EANDC(US)-143U, p.50).	
							HAR	Moxon (AERE-R 6074) estimates accuracy of data between 0.5 and 100 keV to 3-7%.	
							ORL	De Saussure et al., capture work in progress.	
							NPL	Ryves et al. plan activation meas. 120-600 keV.	
							KFK	Froehner et al. plan meas. rel. to (n,p),100-500keV.	
							IAE	Konshin, evaluation in progress.	
85 (2526+)	^{238}U	DIFF INELAST energy,angle	3.0+5	1.0+7	10	1	RAM	Islam, M.M. For fast reactors.	69
							HAR	Armitage, in progress.	
							ANL	Smith has new data to 1.7 MeV, to be publ. in NSE.	
86 (2527+)	^{238}U	INELASTGAMMA energy,angle	3.0+5	4.0+6	10	1	RAM	Islam, M.M. For fast reactors.	69
							CCP	Bakov has data to 10 MeV, AE 29(1970),338.	
							ANL	Poenitz measured at 0.8-1.6 MeV, WASH-1155,6 ; AIEA CN-26/111.	
							SUN	Mc Murray et al. measured at 0.75-1.5 MeV, INDC(SAF)-2/G.	
87 (2528+)	^{238}U	NONELASTIC	1.0+5	1.0+7	10	2	RAM	Islam, M.M. For fast reactors.	69
							BNL	Prince made most recent optical model calculations, AIEA CN-26/91.	
							WEW	Pitterle,most recent evaluation, AIEA CN-26/83.	
88 (2529+)	^{238}U	RESON PARAMS energy dist	+	5.0+3		1	FEI	Nikolaev, M.N. Careful identification of s and p wave resonances needed for determination of p wave strength function. Attention to be paid to distribution of reduced neutron widths of p wave resonances and its agreement with the Porter- Thomas distribution. Request connected with problem of selfshielding evaluation in unresolved resonance region.	71
							GEL	Carraro et al. measured neutron widths up to 5.7 keV AIEA CN-26/17. See also Knoxville Conference,1971. Rohr et al. measured capture widths for 28 resonances below 1 keV, AIEA CN-26/18.	
							COL	Rahn et al. measured neutron widths up to 5 keV, Knoxville Conference,1971.	
89 (2530+)	^{238}U	N,GAMMA see comment	5.0+2	1.4+6	3.0	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Between 1 and 100 keV information on resonance self-shielding factors (see book by Abagyan et al., Consultants Bureau, New York,1964) with 2% accuracy and averaged over 0.2 lethargy intervals desired. Ratios of capture CS of U^{238} to fission CS of U^{235} wanted. For selfshielding evaluation transmission measurements requested with flat response and capture detectors and with attenuations of primary beam down to 1 and 0.1%. Experiments wanted at different temperatures from 70 to 2500°K. Temperature differences of selfshielding factors must be known with 7% accuracy.	71
							ANL	Davey, NSE 39(1970),337, reviews status before Helsinki Conference above resonance range. Several relevant papers at Hels. Conf. (CN-26/18, 43,77, 78, 111).	
							COL	Arbo et al. plan low keV TOF measurement (EANDC(US)-143U, p.50).	
							HAR	Moxon (AERE-R 6074) estimates accuracy of data between 0.5 and 100 keV to 3-7%.	
							ORL	De Saussure et al., capture work in progress.	
							NPL	Ryves et al. plan activation meas. 120-600 keV.	
							KFK	Froehner et al. plan meas. rel. to (n,p),100-500keV.	
							IAE	Konshin, evaluation in progress.	

REF (REG)	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
90 (2531+)	^{238}U	DIFF INELAST energy dist	5.0+4	1.5+7		1	FEI	Nikolaev, M. N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. CS for inelastic removal below fission thresholds of U^{238} (1.5-2.0% acc.y) and of Pu^{240} (or Np^{237}) (3-5% acc.y) wanted. Precision meas. of these integral parameters in shell transmission experiments with Cf^{252} neutron source and U^{238} and Np^{237} fission threshold detectors seems very important. Level exc. CS to be remeasured esp.y in region 1-2 MeV with highest possible resolution and 5% accuracy. For judgment of importance of direct interaction meas. of exc. CS for 44 keV level at 1.5-2.5 MeV of great interest. Decision about tot. inel. CS at 1.0-2.5 MeV wanted. T for calc. of inel. scatt. neutron spectra to be measured with 5% acc.y at 2.5-15 MeV. Spectra and CS for direct inel. scatt. processes to be investigated in MeV region.	71
							ANL	Smith has new data to 1.7 MeV, to be publ. in NSE .	
							GEL	Ahmed et al. have results at 1.5,1.9 and 2.3 MeV.	
							HAR	Barnard et al. measured to 1.5 MeV, NP 80(1966),46.	
							ALD	Cookson measured at 9.7 MeV, AWRE CNR/PR/10.	
91 (2532+)	^{238}U	FISSION see comment	8.0+5	1.5+7		1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Ratio of U^{238} to U^{235} fission CS wanted. Requested accuracies: 5% below 1.3 MeV; 2% at 1.3-6.5 MeV; 5% above 6.5 MeV. At least three different measurements with these accuracies wanted. Absolute fission CS measurements with 2-3% accuracy also desirable.	71
							ANL	Meadows has results below 1.5 MeV, EANDC(US)-143U.	
92 (2533+)	^{238}U	NONELASTIC see comment	1.0+4	1.5+7		1	FEI	Nikolaev, M. N. For evaluation of inelastic scattering CS for fast reactors. Direct measurements by shell transmission desirable with 3-5% accuracy.	71
93 (2534+)	^{238}U	N2N XSECTION energy dist	TR	1.5+7	<10	1	FEI	Nikolaev, M. N. For fast breeder reactors. 5-10% accuracy wanted. Energy spectra of secondary neutrons desirable with 5% accuracy and 0.2 resolution in lethargy.	71
							WEW	Pitterle evaluation reported at Helsinki Conference, AIEA CN-26/83.	
							BRC	Frehaut has data, AIEA CN-26/66.	
							FR	Voigner measured value at 14 MeV, CEA-R-3503.	
							ALD	Mather has data below 10 MeV and plans measurements at 12-15 MeV.	
							JAP	Masanobu et al. measured CS value for fission neutrons, J.Nucl.Sci.Technol.(Tokyo)5(1968), 265.	
94 (2535+)	^{238}U	NU	TR	5. +6	< 0.7	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Ratio to nu of Cf^{252} must be measured with 0.7 % accuracy. Energy dependence must be known with 0.7 % accuracy and about 10 % energy resolution.	71
							BRC	Soleilhac et al., JNE A/B 22(1968), 79, 1.4 - 15 MeV accuracy < 1%.	
							ANL	See also evaluation by Davey, NSE 44(1971), 345.	
							IAE	Manero and Konshin, evaluation in progress.	
95 (2536+)	^{239}Pu	N,GAMMA	THR		1.0	2	IAE	Lemmel, H.D. Confirmation of existing alpha values desirable.	69
96 (2537+)	^{239}Pu	ETA	1.0-2	1.0+0	0.5	2	IAE	Lemmel, H.D. Discrepancy between Macklin Mn bath (NSE 14(1969)101) and Smith monokinetic measurements (IDO-17083,1966).	69
97 (2538+)	^{239}Pu	SPECT FISS N see comment	THR		1.0	1	IAE	Lemmel, H.D. Mean spectrum energy with 1% accuracy plus spectrum shape requested for calibration of nu-bar measurements. Absolute or relative to other fissile isotopes wanted.	69

REF (REG)	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
98 (2539+)	^{239}Pu	ALPHA	1.0+2	1.0+7	5.0	2	PEL	Van der Walt, R. For fast reactor calculations.	69
							LAS	Farrell et al. have data above 20 eV from Physics 8, AIEA CN-26/46.	
							LRL	Czirr has data 0.1-30 keV, EANDC(US)-122U.	
							ITE	Sukhoruchkin, review of avail. data, AIEA CN-26/127.	
							IAE	Sowerby and Konshin, evaluation in progress.	
99 (2540+)	^{239}Pu	FISSION	THR	1.5+7	5.0	1	RAM	Islam, M.M. For fast reactors.	69
							LAS	Farrell et al. have data from Physics 8 above 20 eV. AIEA CN-26/46.	
							ANL	Poenitz measured fission ratio to U^{235} 130 keV to 1.4 MeV, EANDC(US)-143-U.	
							LRL	Czirr et al. measured 0.1-30 keV, EANDC(US)-122-U.	
							SAC	Blons et al. have data up to 30 keV. AIEA CN-26/63.	
							CAD	Szabo et al. have data 25 keV to 1 MeV, absolute accuracy ±3%.	
							HAR	Evaluation of existing data in progress above 100 eV. See Sowerby and Patrick, AIEA CN-26/34. CS probably known to about 3-5% below 10 keV when consistently normalized. Data available below 20 keV summarized by James, AIEA CN-26/107.	
							IAE	Byer, evaluation in progress.	
100 (2541+)	^{239}Pu	N,GAMMA	THR	3.0+4	3.0	2	RAM	Islam, M.M. For fast reactors.	69
							LAS	Farrell et al. have data above 20 eV from Physics 8, AIEA CN-26/46.	
							LRL	Czirr has data 0.1-30 keV, EANDC(US)-122U.	
							ITE	Sukhoruchkin, review of avail. data, AIEA CN-26/127.	
							IAE	Sowerby and Konshin, evaluation in progress.	
101 (2542+)	^{239}Pu	NONELASTIC	1.0+5	1.0+7	10	2	RAM	Islam, M.M. For fast reactors.	69
							BNL	Prince made most recent optical model calculations, AIEA CN-26/91.	
102 (2543+)	^{239}Pu	DIFF INELAST energy,angle	3.0+5	1.0+7	10	1	RAM	Islam, M.M. For fast reactors.	69
103 (2544+)	^{239}Pu	INELASTGAMMA energy,angle	3.0+5	4.0+6	10	1	RAM	Islam, M.M. For fast reactors.	69
							TNC	Nellis et al.,in progress, WASH-1155, 214.	
							LAS	Drake et al. measured at 4.0-7.7 MeV, NSE 40 (1970), 294.	
104 (2545+)	^{239}Pu	FISSION	2.0+4	2.0+6	3.0	2	ITK	Mehta, G.K. Cross section required at 60, 150, 200, 500 keV and 1 MeV with energy resolution of 5%.	69
							LAS	Farrell et al. have data from Physics 8 above 20 eV. AIEA CN-26/46.	
							ANL	Poenitz measured fission ratio to U^{235} 130 keV to 1.4 MeV, EANDC(US)-143-U.	
							LRL	Czirr et al. measured 0.1-30 keV, EANDC(US)-122-U.	
							SAC	Blons et al. have data up to 30 keV. AIEA CN-26/63.	
							CAD	Szabo et al. have data 25 keV to 1 MeV, absolute accuracy ±3%.	
							HAR	Evaluation of existing data in progress above 100 eV. See Sowerby and Patrick, AIEA CN-26/34. CS probably known to about 3-5% below 10 keV when consistently normalized. Data available below 20 keV summarized by James, AIEA CN-26/107.	
							IAE	Byer, evaluation in progress.	
105 (2546+)	^{239}Pu	N,GAMMA	1.0+2	1.0+6	5.0	2	ITK	Mehta, G.K. Energy dependence required.	69
							LAS	Farrell et al. have data above 20 eV from Physics 8, AIEA CN-26/46.	
							LRL	Czirr has data 0.1-30 keV, EANDC(US)-122U.	
							ITE	Sukhoruchkin, review of avail. data, AIEA CN-26/127.	
							IAE	Sowerby and Konshin, evaluation in progress.	

REF (REG]	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
106 (2547+]	^{239}Pu	FRAG NEUTRNS see comment	5.0+4	1.0+6	10.0	2	ITK	Mehta, G.K. Prompt neutrons as function of fprod mass wanted.	69
107 (2548+]	^{239}Pu	ALPHA	1.0+2	1.0+5	5.0	2	AUA	Symonds, J.L. Available data do not satisfy request.	69
							LAS	Farrell et al. have data above 20 eV from Physics 8, AIEA CN-26/46.	
							LRL	Czirr has data 0.1-30 keV, EANDC(US)-122U.	
							ITE	Sukhoruchkin, review of avail. data, AIEA CN-26/127.	
							IAE	Sowerby and Konshin, evaluation in progress.	
108 (2549+]	^{239}Pu	FISSION ratio x-sect	1.0+3	5.0+4	3.0	1	IAE	Byer, T.A. Relative to U235 fission CS. Upper energy limit about 50 keV to give overlap with data of Pfletschinger (NSE 40(1970),375) and of Allen and Ferguson (Proc.Phys.Soc.70A(1957),573). Thick target should be used to produce continuous "white"spectrum of neutrons.	71
							IAE	Byer, recent evaluation (INDC(NDS)-33/G) indicates that Lehto data (NSE 39(1970),361) are inadequate below 10 keV.	
109 (2550+]	^{239}Pu	FISSION	2.0+4	1.0+6	< 3.0	1	IAE	Byer, T.A. Absolute measurement required to 2-3% accuracy over entire energy range to confirm data of Szabo et al. (71KNOX 2,573,and EANDC Standards Symposium, Argonne,1971, Proc. p.257). Confirmation of Szabo data very important since they play the most prominent role in all Pu239 fission CS evaluations.	71
110 (2551+]	^{239}Pu	FISSION ratio x-sect	6.0+5	2.0+6	2.0	2	IAE	Byer, T.A. Relative to U235 fission CS. To confirm strong dip in Pfletschinger ratios (NSE 40(1970),375) between 0.8 and 1.0 MeV. Between 1 and 2 MeV to better establish shape and magnitude of ratio, since Savin (AE29(1970),218) and Soleilhac (AIEA CN-26/67) ratios inconsistent with other ratio data.	71
							ANL	Poenitz performing measurements.	
111 (2552+]	^{239}Pu	FISSION	1.0+6	1.0+7	< 5.0	2	IAE	Byer, T.A. Absolute measurement required to 4-5% accuracy from 1-10 MeV. No absolute Pu239 fission CS data available extending over this energy range.	71
112 (2553+]	^{239}Pu	DIFF INELAST energy dist	TR	1.5+7		1	FEI	Nikolaev, M.N. For 1.0 % accuracy in Keff of fast breeders. CS for inelastic removal below fission thresholds of U238 and of Pu240 (or Np237) desired with 10% accuracy. Excitation CS for low lying levels requested with 15% accuracy.	71
							HAR	Measurements 1.5-5.5 MeV in progress. Measurements of Cavanagh et al. (AERE-R 5972,EANDC(UK)-101) cover level exc. CS for energies of 150-1550 keV.	
113 (2554+]	^{239}Pu	ALPHA	1.0+2	8.0+5	7.0	1	FEI	Nikolaev, M.N. For accuracy of 1.6 % in BR for fast breeders. In region 1-100 keV better accuracy desirable (4-5%). For evaluation of differences in capture and fission resonance selfshielding, measurements of transmission curves by self-detection method with fission and absorption detectors very desirable. Beam attenuation down to 1% wanted. Lethargy resolution of 0.2 sufficient for region 0.1-30 keV. At least three different results must coincide within requested accuracy.	71
							LAS	Farrell et al. have data above 20 eV from Physics 8, AIEA CN-26/46.	
							LRL	Czirr has data 0.1-30 keV, EANDC(US)-122U.	
							ITE	Sukhoruchkin, review of avail. data, AIEA CN-26/127.	
							IAE	Sowerby and Konshin, evaluation in progress.	

REP (REG)	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
114 (2555+)	239Pu	NU see comment	THR	2.5+6	0.5	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. 0.5 % accuracy required for measurement of ratio nu Pu239 to nu Cf252. Energy dependence of nu is wanted with 0.7 % accuracy and 10 % energy resolution in the region below 2.5 MeV.	71
							HAR	Colvin reviewed status before Helsinki Conference, AIEA CN-26/99.	
							ANL	Evaluation by Davey, NSE 44(1971), 345.	
							IAE	Manero and Konshin, evaluation in progress.	
115 (2556+)	239Pu	NU see comment	THR	2.5+6	0.1	2	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. 0.1 % accuracy required for measurement of ratio nu U235 to nu Cf252, evaluated from optimum distribution of uncertainties over uncorrelated nuclear data.	71
							HAR	Colvin reviewed status before Helsinki Conference, AIEA CN-26/99.	
							ANL	Evaluation by Davey, NSE 44(1971), 345.	
							IAE	Manero and Konshin, evaluation in progress.	
116 (2557+)	239Pu	FISSION see comment	1.0+3	4.0+6	< 2.0	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Measurements mainly wanted relative to fission CS of U235. Optimum precision of 1.5 % desired in region 20 keV to 1 MeV. Below 30 keV measurements of transmission curves by flat response detector and by self detection method with fission detector wanted for selfshielding evaluation. These curves must be measured with attenuations of the primary beam down to 1 %. Lethargy resolution of about 0.2 considered sufficient for such measurements. Request considered fulfilled, when at least three measurements with different methods agree within requested accuracy.	71
							LAS	Farrell et al. have data from Physics 8 above 20 eV. AIEA CN-26/46.	
							ANL	Poenitz measured fission ratio to U235, 130 keV to 1.4 MeV, EANDC(US)-143-U.	
							LRL	Czirr et al. measured 0.1-30 keV, EANDC(US)-122-U.	
							SAC	Blons et al. have data up to 30 keV. AIEA CN-26/63.	
							CAD	Szabo et al. have data 25 keV to 1 MeV, absolute accuracy ±3%.	
							HAR	Evaluation of existing data in progress above 100 eV. See Sowerby and Patrick, AIEA CN-26/34. CS probably known to about 3-5% below 10 keV when consistently normalized. Data available below 20 keV summarized by James, AIEA CN-26/107.	
							IAE	Byer, evaluation in progress.	
117 (2558+)	240Pu	NU	TR	5.0+6	1.0	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders.	71
							KUR	Savin et al. measured at 1-4 MeV with 3-5% accuracy, AIEA CN-26/40.	
							IAE	Manero and Konshin, evaluation in progress.	
118 (2559+)	240Pu	FISSION ratio x-sect	1.0+5	5.0+6	5.0	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Measurements wanted relative to U235 fission CS.	71
119 (2560+)	240Pu	N,GAMMA ratio x-sect	5.0+2	1.4+6	7.0	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Measurements wanted relative to U235 fission CS.	71
							RPI	Hockenbury et al. report new capture data at 4-60 keV 30-40% higher than Harwell data, EANDC(US)-143U.	

REF (REG)	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
120 (2561+)	^{240}Pu	RESON PARAMS see comment	1.0+1	5.0+3		1	FEI	Nikolaev, M. N. Neutron and capture widths wanted for evaluation of selfshielding in resolved resonance region. Average s and p wave resonance parameters should be derived. Statistical analysis of measured res. par. wanted.	71
							GEL	Comprehensive Geel measurements reported at Washington Conference 1968 yielded neutron widths up to 5.7 keV, capture widths up to 820 eV and fission widths up to 750 eV.	
121 (2562+)	^{240}Pu	DIFF INELAST energy dist	TR	5.0+6	10	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. CS for inelastic removal below fission thresholds of U^{238} and Pu^{240} (or Np^{237}) wanted with 10% accuracy.	71
							ANL	Smith has results to 1.5 MeV.	
122 (2563+)	^{241}Pu	NU	THR	1.0+7	1.0	1	AUA	Symonds, J. L. Available data do not satisfy request.	69
							FOA	Conde and Holmberg measured five values from 0.52 to 15 MeV, J. Nucl. En. 22 (1968), 53.	
							ANL	Evaluation by Davey, NSE 44 (1971), 345.	
							IAE	Manero and Konshin, evaluation in progress.	
123 (2564+)	^{241}Pu	ALPHA	1.0+2	1.0+6	10.0	2	AUA	Symonds, J.L. No experimental data available.	69
							ALD	Moat et al. have some data from Physics 7 event.	
							INC	Smith is evaluating for ENDF/B.	
124 (2565+)	^{241}Pu	ETA	THR		1.5	2	IAE	Lemmel, H.D. For thermal reactors.	69
125 (2566+)	^{241}Pu	SPECT FISS N see comment	THR		1.0	1	IAE	Lemmel, H.D. Mean spectrum energy with 1% accuracy plus spectrum shape requested for calibration of nu-bar measurements. Absolute or relative to other fissile isotopes wanted.	69
126 (2567+)	^{241}Pu	MISCELLANEOS see comment	+		0.2	1	IAE	Lemmel, H.D. Beta decay half-life required for 2200 m/s fission constant evaluation. Recent data are discrepant by 6% although better acc.y is claimed for individual data.	69
127 (2568+)	^{252}Cf	NU	SPON		0.5	1	IAE	Lemmel, H.D. Serious discrepancies between available direct measurements.	69
							IAE	Hanna et al. evaluation, At. En. Rev. 7 (1969) No. 4, gives nu(tot) = 3.765 ± 0.012.	
							ANL	De Volpi and Porges, Phys. Rev. C1 (1970), 683, evaluate nu(tot) = 3.725 ± 0.0015.	
							NPL	Axton, work in progress.	
							AUL	Boldeman, liqu. scint. work in progress.	
128 (2569+)	^{252}Cf	SPECT FISS N see comment	SPON		1.0	1	IAE	Lemmel, H.D. Mean spectrum energy with 1% accuracy plus spectrum shape requested for calibration of nu-bar measurements. Absolute or relative to other fissile isotopes wanted.	69
129 (2570+)	^{252}Cf	NU	SPON		0.5	2	AUA	Symonds, J.L. For obtaining nu from relative measurements on U^{233}, U^{235}, Pu^{239} and Pu^{241}.	69
							IAE	Hanna ét al. evaluation, At. En. Rev. 7 (1969) No. 4, gives nu(tot) = 3.765 ± 0.012.	
							ANL	De Volpi and Porges, Phys. Rev. C1 (1970), 683, evaluate nu(tot) = 3.725 ± 0.0015.	
							NPL	Axton, work in progress.	
							AUL	Boldeman, liqu. scint. work in progress.	
130 (2571+)	^{252}Cf	F NEUT DELAY see comment	SPON		20	2	AUA	Symonds, J.L. Delayed gamma yield wanted. Required for correcting Cf^{252} nu calibrations. Refer Hanna et al. evaluation At.En.Rev. 7 (1969), 3.	69
							AUA	Boldeman planning measurements to 20%.	

REF (REG]	NUCLIDE	QUANTITY	ENERGY(EV) MIN	MAX	ACCURACY (%)	P	LAB	REQUESTER , COMMENTS	YEAR
131 (2572+]	^{252}Cf	NU	SPON		< 0.5	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders.	71
							IAE	Hanna et al. evaluation, At. En. Rev. 7(1969) No. 4, gives nu(tot) = 3.765 ± 0.012.	
							ANL	De Volpi and Porges, Phys. Rev. C1(1970), 683, evaluate nu(tot) = 3.725 ± 0.0015.	
							NPL	Axton, work in progress.	
							AUL	Boldeman, liqu. scint. work in progress.	
132 (2573+]	^{252}Cf	NU	SPON		0.1	2	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Evaluated from optimum distribution of uncertainties over uncorrelated nuclear data.	71
							IAE	Hanna et al. evaluation, At. En. Rev. 7(1969) No. 4, gives nu(tot) = 3.765 ± 0.012.	
							ANL	De Volpi and Porges, Phys. Rev. C1(1970), 683, evaluate nu(tot) = 3.725 ± 0.0015.	
							NPL	Axton, work in progress.	
							AUL	Boldeman, liqu. scint. work in progress.	
133 (2574+]	H2O	THRMLSCATLAW	0. +0	2.0-1		2	HLT	Jauho, P. Scattering law for water at higher temperature (100°C) wanted for calculation of reactivity effects as function of temperature.	69
							RPI	Esch et al. measured at 0.04-0.63 eV and at 27, 170 and 270°C, RPI-328-210.	
134 (2575+]	METAN	THRMLSCATLAW	0. +0	1.0-1		2	HLT	Tunkelo, E. Scattering law for solid and liquid methan wanted. For design of refrigerated neutron source.	69
135 (2576+]	SS	N,GAMMA ratio x-sect	5.0+2	5.0+5	10	1	FEI	Nikolaev, M. N. For fast reactor BR prediction with 1.6% accuracy. Analysis of fast critical assemblies indicates, that capture CS of stainless steel much greater than evaluated from microscopic data. Measurement wanted relative to fission CS of U^{235}.	71
136 (2577+]	FPROD	N,GAMMA	1.0+2	1.0+5	20	1	FEI	Nikolaev, M.N. For accuracies of 1.0 % in Keff and 1.6 % in BR for fast breeders. Average capture CS for gross fission products (stable and long-lived as well as equilibrium fiss. prod. for fast reactors) wanted. Data for fiss. prod. of U^{235}, U^{238}, Pu^{239} and Pu^{240} are of great interest.	71
137 (2578+]	FPROD	N,GAMMA (res. param)	THR	1.0+5		2	AUA	Symonds, J.L. Capture CS and s, p and d wave strength functions desired for theoretical predictions of cross sections for masses 80-160.	69
							AUA	Bird et al. working in keV region using capture gamma rays.	
							BOL	Benzi et al., extensive evaluation, CEC(70)-2,1970.	

TABLE 1

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TABLE 2

QUANTITIES (CROSS SECTIONS AND PARAMETERS)

(Notation used is that of H. Goldstein: "Nomenclature Scheme for Experimental Monoenergetic Nuclear Cross Sections", Fast Neutron Physics, Vol. II, p. 2227, Interscience, New York (1963).)

Printout	Symbolic notation	Description
TOTAL XSECT	$\sigma_{nT}(E)$	Total neutron cross section
RESON PARAMS	Γ, Γ_n, Γ_p, Γ_γ, etc.	Parameters characterizing a resonance or derived from properties of sets of resonances
ELASTIC	$\sigma_{n,n}(E)$	Total elastic scattering cross section
DIFF ELASTIC	$\sigma_{n,n}(E,\theta)$	Differential elastic scattering cross section
SCATTERING	$\sigma_{nS}(E)$ $\sigma_{nS}(E,\theta)$	Information on the total scattering cross section; $\sigma_{nS} = \sigma_{n,n} + \sigma_{n,n'}$
N PRODUCTION	$\sigma_{nP}(E)$ $\sigma_{nP}(E,\theta)$ $\sigma_{nP}(E, E')$ $\sigma_{nP}(E; E', \theta)$	Information on the collection of all processes in which one or more neutrons are produced; $\sigma_{nP} = \sigma_{n,n} + \sigma_{nM} = \sigma_{n,n} + \sigma_{n,n'} + 2\sigma_{n,2n} + 3\sigma_{n,3n} + \bar{\nu}\sigma_{n,f} + \sigma_{n,np} + \ldots$
NONELASTIC	$\sigma_{nX}(E)$ $\sigma_{nX}(E,\theta)$ $\sigma_{nX}(E, E')$ $\sigma_{nX}(E; E', \theta)$	Information on the cross section for nonelastic processes: $\sigma_{nX}(E) = \sigma_T(E) - \sigma_{n,n}(E)$
EMISS XSECT	$\sigma_{nM}(E)$ $\sigma_{nM}(E,\theta)$ $\sigma_{nM}(E, E')$ $\sigma_{nM}(E; E', \theta)$	Information on neutron emission, i.e. on the collection of all processes in which one or more neutrons are emitted; $\sigma_{nM} = \sigma_{nP} - \sigma_{n,n}$
NONEL GAMMAS	$\sigma_{nG}(E)$ $\sigma_{nG}(E; E_\gamma)$ $\sigma_{nG}(E; E_\gamma, \psi)$	Information on the production of gamma rays by neutron interactions
TOT INELASTIC	$\sigma_{n,n'}(E)$	Total neutron inelastic scattering cross section
DIFF INELAST	$\sigma_{n,n'}(E,\theta)$ $\sigma_{n,n'}(E, E')$ $\sigma_{n,n'}(E; E',\theta)$	Cross section for inelastic scattering of neutrons represented as a function of angle, energy (or both) for the scattered neutron

Printout	Symbolic notation	Description
INELST GAMMA	$\sigma_{n,n'\gamma}(E,\psi)$ $\sigma_{n,n'\gamma}(E, E_\gamma)$ $\sigma_{n,n'\gamma}(E; E_\gamma,\psi)$	Information on photons emitted in inelastic neutron scattering processes
N2N XSECTION	$\sigma_{n,2n}(E)$ $\sigma_{n,2n}(E, E')$ $\sigma_{n,2n}(E; E',\theta)$	All information on the (n,2n) cross section, whether or not accompanied by other particles
N3N XSECTION	$\sigma_{n,3n}(E)$	All information on the (n,3n) cross section, whether or not accompanied by other particles
THRMLSCATLAW		All information on the thermal scattering law, on the scattering, both elastic and inelastic, of neutrons of thermal energies from molecules, liquids, crystals, etc.
FISSION	$\sigma_{n,f}(E)$	Cross section for neutron induced fission
ETA	η	Number of neutrons emitted per neutron absorption; $\eta = \bar{\nu} \cdot \frac{\sigma_{n,f}}{\sigma_{n,\gamma} + \sigma_{n,f}}$
ALPHA	α	The capture to fission ratio; $\alpha = \frac{\sigma_{n,\gamma}}{\sigma_{n,f}}$
NU	ν	All information on the number of neutrons emitted per fission, chiefly as $\bar{\nu}$ total, where not otherwise specified, but <u>not</u> delayed yields
F NEUT DELAY		All information, yields, energies, etc., on delayed neutrons from fission
FRAG NEUTS		Information on neutrons emitted by a given fission fragment
SPECT FISS N	$N_f(E, E')$	Spectrum of neutrons emitted in fission
SPECT FISS G	$N_f(E, E_\gamma)$	Spectrum of prompt photons emitted in fission
FISS YIELD		Yields of fission products or fission fragments
FRAG SPECTRA		Information on the energy, angle or velocity distribution of the fission fragments as a function of each other or of the fragment mass
FRAG CHARGE		Information on the charge distribution of fission fragments

Printout	Symbolic notation	Description
PHOTO-FISSN		Information on photon induced fission
FISS PROD GS		Information on gamma rays from fission products
RES INT FISS	$\int \frac{\sigma_{n,f}(E)}{E} dE$	Resonance integral for fission
ABSORPTION	$\sigma_{nA}(E)$	Absorption cross section; $\sigma_{nA} = \sigma_{nT} - \sigma_{nS}$
RES INT ABS	$\int \frac{\sigma_{nA}(E)}{E} dE$	Resonance integral for absorption (For fissionable nuclei includes RES INT FISS and RES INT CAPT)
DISAPPEARANC	$\sigma_{nD}(E)$	Neutron disappearance (or removal) cross sections; $\sigma_{nD}(E) = \sigma_{n,\gamma} + \sigma_{nC}$ (C = charged particle)
ACTIVATION	$\sigma_{act}(E \mid {}^{A}Z)$	Activation cross section for nuclide ${}^{A}Z$
RES INT ACT	$\int \frac{\sigma_{act}(E)}{E} dE$	Resonance integral for activation
RES INT CAPT	$\int \frac{\sigma_{n,\gamma}(E)}{E} dE$	Resonance integral for capture. Restricted in principle to fissionable nuclides - for non-fissionable nuclides see RES INT ABS
N, GAMMA	$\sigma_{n,\gamma}(E)$	Radiative capture cross section
SPECT NGAMMA	$N_{\gamma}(E; E_{\gamma})$	Spectrum of gamma rays from radiative neutron capture
N, PROTON	$\sigma_{n,p}$ E) $\sigma_{n,p}(E,\theta)$	Information on reactions emitting one or more protons only
N, DEUTERON	$\sigma_{n,d}(E)$ $\sigma_{n,d}(E,\theta)$	Information on reactions emitting one or more deuterons only
N, TRITON	$\sigma_{n,t}(E)$ $\sigma_{n,t}(E,\theta)$	Information on reactions emitting one or more tritons only
N, HELIUM3	$\sigma_{n,{}^3He}(E)$ $\sigma_{n,{}^3He}(E,\theta)$	Information on reactions emitting one or more helium-3 particles only
N, ALPHA	$\sigma_{n,\alpha}(E)$ $\sigma_{n,\alpha}(E,\theta)$	Information on reactions emitting one or more alpha-particles only
N, N PROTON	$\sigma_{n,np}(E)$	Information on the (n,np) reactions
PROTON, N	$\sigma_{p,n}(E)$	Information on the (p,n) reactions

Printout	Symbolic notation	Description
GAMMA,N	$\sigma_{\gamma,n}(E_\gamma)$	Cross sections of photoneutron reactions
NUCL. LEVELS		Information on details of nuclear structure: levels, spins and parities, etc.
LVL DEN LAW		All information on the density of levels in the continuum range: temperature, functional forms, etc.
MISCELLANEOS		Information on various quantities defined in the associated comment, which are not naturally included in any one of the quantities listed

A few of the "collective" cross sections might be unfamiliar, and some "sum rules" for these cross sections may be helpful.

Total $= \sigma_{nT} = \sigma_{n,n} + \sigma_{nX}$ = Elastic + Nonelastic

$= \sigma_{nS} + \sigma_{nA}$ = Scattering and Absorption

Scattering $= \sigma_{nS} = \sigma_{n,n} + \sigma_{n,n'}$ = Elastic + Inelastic

Nonelastic $= \sigma_{nX} = \sigma_{nT} - \sigma_{n,n}$

N Production $= \sigma_{nP} = \sigma_{n,n} + \sigma_{n,n'} + 2\sigma_{n,2n} + 3\sigma_{n,3n} + \bar{\nu}\gamma_{n,f} + ..$

Emission $= \sigma_{nM} = \sigma_{n,n'} + 2\sigma_{n,2n} + 3\sigma_{n,3n} + \bar{\nu}\gamma_{n,f} + \ldots$

Absorption $= \sigma_{nA} = \sigma_{nT} - \sigma_{nS}$

Disappearance $= \sigma_{nD} = \sigma_{n,\gamma} + \sigma_{nC}$ (C = charged particle)

TABLE 3

QUANTITY MODIFIERS

Printout	Description
energy dist	energy distribution (spectrum) of emitted particles or photons
(energy)	energy distribution requested as a secondary or alternative quantity
< energy >	average over the energy interval stated is requested as a supplementary or alternative quantity
angular dist	angular distribution of emitted particles or photons
expans.coeff	coefficients for expansion in orthogonal polynomials
energy, angle	energy distributions requested as a function of angle
(averaged)	a specified average (see comment) of the principal quantity is requested as secondary or alternative quantity
spectrum	(specified in comment)
ratio xsect	ratio of cross sections or cross section measured relative to standard specified in comment
relative	quantity other than cross section measured relative to standard specified in comment
(alpha)	capture to fission ratio
(eta)	the number of neutrons emitted per absorption
reson.integ	resonance integral of principal quantity
(res. int)	resonance integral requested as secondary or alternative quantity
( ) res. int	resonance integral requested for region above energy range stated for principal request
(res. param)	resonance parameters requested as secondary or alternative quantity
see comment	more extensive explanation given in comment
gammaspectra	energy spectra of emitted gamma rays
absolute	an absolute measurement (i.e. not directly or indirectly related to a standard)
yield	yield of emitted particles is requested as secondary or alternative quantity
res.energy alpha width fissionwidth gamma width neutronwidth protonwidth total width absorpwidth	For requests on resonance parameters the Quantity "Resonance Parameters" is used and the request is specified by supplementary modifiers or in the comment

TABLE 4

LABORATORIES (ALPHABETIC BY ABBREVIATION)

AE	AB ATOMENERGI, STUDSVIK + STOCKHOLM	SWEDEN
AFW	AIR FORCE WEAPONS LABORATORY, KIRTLAND, NEW MEXICO	USA
AI	ATOMICS INTERNATIONAL, CANOGA PARK, CALIF.	USA
AIN	A.I.N.S.E., LUCAS HEIGHTS, NSW	AUSTRALIA
ALD	AWRE, ALDERMASTON	UNITED KINGDOM
AML	U. OF MELBOURNE	AUSTRALIA
AMS	U. OF AMSTERDAM + IKO	NETHERLANDS
ANL	ARGONNE NATIONAL LAB., LEMONT, ILLINOIS	USA
ARK	U. OF ARKANSAS, FAYETTEVILLE	USA
AUA	A.A.E.C. RESEARCH ESTABLISHMENT, N.S.W.	AUSTRALIA
AUL	AUSTRALIA	AUSTRALIA
BBC	BROWN-BOVERI/KRUPP, MANNHEIM	GERMANY
BET	WESTINGHOUSE, BETTIS ATOMIC POWER LAB.PITTSBURGH	USA
BHU	BANARAS HINDU UNIV. VARANASI	INDIA
BLG	BELGIUM	BELGIUM
BN	BELGONUCLEAIRE	BELGIUM
BNL	BROOKHAVEN NATIONAL LAB., UPTON, N.Y.	USA
BNW	BATTELLE-NORTHWEST,RICHLAND,WASH.(FORM.HANF.AT.PROD.)	USA
BOL	BOLOGNA	ITALY
BOS	BOSE INST., CALCUTTA	INDIA
BRC	CEN BRUYERE LE CHATEL	FRANCE
BUL	BULGARIA	BULGARIA
CAD	CADARACHE, BOUCHES DU RHONE	FRANCE
CAN	CANADA	CANADA
CAS	CENTRO DI STUDI NUCLEARI DELLA 'CASACCIA', ROME	ITALY
CCP	USSR	USSR
CHF	FORMOSA	FORMOSA
CNE	COM. NACIONAL DE ENERG. ATOM., BUENOS AIRES	ARGENTINA

COL	COLUMBIA U., NEW YORK CITY, N.Y.	USA
CRC	CHALK RIVER, ONTARIO	CANADA
CSE	CASE INSTITUTE OF TECH., CLEVELAND, OHIO	USA
DEB	ATOMMAG KUTATO INTEZETE, DEBRECEN	HUNGARY
DUB	JOINT INSTITUTE FOR NUCLEAR RESEARCH, DUBNA	USSR
FAR	FONTENAY-AUX-ROSES, SEINE	FRANCE
FEI	FIZIKO-ENERGETICHESKIJ INSTITUT, OBNINSK	USSR
FLA	U. OF FLORIDA, GAINESVILLE, FLORIDA	USA
FOA	RESEARCH INSTITUTE OF NAT'L DEFENSE, STOCKHOLM	SWEDEN
FR	FRANCE	FRANCE
FRK	J.W. GOETHE UNIVERSITY, FRANKFURT	GERMANY
GA	GENERAL ATOMIC, SAN DIEGO, CALIFORNIA	USA
GDT	GENERAL DYNAMICS, FORT WORTH, TEXAS	USA
GE	GENERAL ELECTRIC - NUCLEAR MATERIALS	USA
GEL	B.C.M.N. EURATOM, GEEL	BELGIUM
GES	GE-SCHENECTADY (DIFFERENT FROM KAPL)	USA
GIT	GEORGIA INST. OF TECHNOLOGY, ATLANTA	USA
GRE	GRENOBLE (CEA AND UNIVERSITY)	FRANCE
HAM	INST. FUR EXPERIMENTALPHYSIK, HAMBURG	GERMANY
HAR	AERE, HARWELL	UNITED KINGDOM
HLT	TECH. UNIV. OF HELSINKI, OTANIEMI	FINLAND
IAE	INTERN. ATOMIC ENERGY AGENCY, VIENNA	AUSTRIA
IEN	INSTITUTO DE ENGENHARIA NUCLEAR, RIO DE JANEIRO	BRAZIL
IFU	INSTITUT FIZIKI AN UKRAINSKOI SSR, KIEV	USSR
INC	IDAHO NUCLEAR CORPORATION, IDAHO FALLS, IDAHO	USA
IRK	INSTITUT FUR RADIUMFORSCHUNG UND KERNPHYSIK, VIENNA	AUSTRIA
ISP	EURATOM, ISPRA	ITALY
IST	IMP. COLL. OF SCI. + TECHN., LONDON	UK
ITE	INST. TEORETICHESKOI I EXPERIMENTALNOI FIZIKI MOSCOW	USSR
ITK	INDIAN INST. OF TECHNOLOGY, KANPUR	INDIA
JAE	JAPAN ATOMIC ENERGY RESEARCH INST. TOKAI	JAPAN
JAP	JAPAN	JAPAN

JUL	KERNFORSCHUNGSANLAGE JUELICH	GERMANY
KAP	KNOLLS ATOMIC POWER LAB., SCHENECTADY, NEW YORK	USA
KAZ	INST. JAD FIZIKI, KAZAKHSTAN	USSR
KFK	KERNFORSCHUNGSZENTRUM KARLSRUHE	GERMANY
KIL	U. OF KIEL	GERMANY
KOS	KOSSUTH UNIV., INST. FOR EXP. PHYSICS, DEBRECEN	HUNGARY
KTY	U. OF KENTUCKY, LEXINGTON, KENTUCKY	USA
KUR	I.V. KURCHATOV ATOMIC ENERGY INST., MOSCOW	USSR
LAS	LOS ALAMOS SCIENTIFIC LAB., NEW MEXICO	USA
LOK	LOCKHEED AIRCRAFT, SUNNYVALE, CALIF.	USA
LON	U. OF LONDON	UNITED KINGDOM
LRC	NASA LEWIS RES.CENTRE, CLEVELAND, OHIO	USA
LRL	LAWRENCE RADIATION LAB., LIVERMORE, CALIFORNIA	USA
MHG	U. OF MICHIGAN	USA
MIT	MIT. CAMBRIDGE, MASSACHUSETTS	USA
MOL	CEN MOL	BELGIUM
MTR	PHILLIPS PETROLEUM CO.-MTR., IDAHO FALLS, IDAHO	USA
MUN	TECHNISCHE HOCHSCHULE MUENCHEN, MUNICH	GERMANY
NAP	U. OF NAPLES	ITALY
NBS	NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.	USA
NDL	U.S. ARMY NUCLEAR DEFENCE LAB.	USA
NED	NETHERLANDS	NETHERLANDS
NEU	U. OF NEUCHATEL	SWITZERLAND
NIR	NAUCHNO-ISSLEDOV.INST. ATOMNYKH REAKTOROV	USSR
NJS	NUK INST JOZEF STEFAN. LJUBLJANA	YUGOSLAVIA
NPL	NATIONAL PHYSICAL LABORATORY, TEDDINGTON	UNITED KINGDOM
NRD	U.S. NAVAL RADIOLOGICAL DEFENSE LAB., SAN FRANCISCO	USA
OHO	OHIO U., ATHENS, OHIO	USA
ORL	OAK RIDGE NATIONAL LAB., TENNESSEE	USA
OTU	U. OF OTTAWA, ONTARIO	CANADA
PAD	U. OF PADUA	ITALY
PEL	AE BOARD, PELINDABA, PRETORIA	SOUTH AFRICA

RAM	ATOMIC ENERGY CENTRE, RAMNA, DACCA	PAKISTAN
RDT	DIV. OF REACTOR DEV. + TECH., USAEC	USA
RIS	RISO, R OSKILDE	DENMARK
ROS	ROSSENDORF BEI DRESDEN	GERMANY
RPI	RENSSELAER POLYTECHNIC INST., TROY, NEW YORK	USA
SAC	CEN SACLAY, (91) GIF-sur YVETTE	FRANCE
SAF	SOUTH AFRICA	SOUTH AFRICA
SAH	SAHA INSTITUTE, CALCUTTA	INDIA
SCT	U. OF CAPE TOWN	SOUTH AFRICA
SCU	USSR STATE COMM. FOR ATOMIC ENERGY, MOSCOW	USSR
SRE	SIEMENS REACTORENTWICKLUNG, ERLANGEN	GERMANY
SRL	SAVANNAH RIVER LAB., AIKEN, S.C.	USA
STF	STANFORD U., MENLO PARK, CALIFORNIA	USA
SUN	SOUTHERN UNIVERSITIES NUC. INST., FAURE, C.P.	SOUTH AFRICA
TAT	TATA INSTITUTE, BOMBAY	INDIA
TEX	U. OF TEXAS, AUSTIN, TEXAS	USA
TNC	TEXAS NUCLEAR CORP., AUSTIN, TEXAS	USA
TOR	U. OF TORONTO	CANADA
TRM	ATOMIC ENERGY EST.TROMBAY, BOMBAY NOW BHABHA AT.RES.C.	INDIA
TUR	U. OF TORINO	ITALY
UKW	WINDSCALE REACTOR DEVELOPMENT LABS. UKAEA	UNITED KINGDOM
UPR	UNIVERSITY OF PRETORIA	SOUTH AFRICA
VNV	CEN VILLENEUVE	FRANCE
WAL	WESTINGHOUSE ASTRONUCLEAR LAB., PITTSBURGH	USA
WAS	WASHINGTON U., ST.LOUIS, MISSOURI	USA
WES	WESTINGHOUSE RESEARCH, PITTSBURGH, PENNSYLVANIA	USA
WEW	WESTINGHOUSE ADVANCED REACTORS DIV., MADISON, PENN.	USA
WIN	AEE, WINFRITH	UNITED KINGDOM
WRU	CASE WESTERN RESERVE UNIVERSITY	USA
WUR	EIDG. INSTITUT FUER REAKTORFORSCHUNG, WUERENLINGEN	SWITZERLAND
WWA	U. OF WARSAW + PAN.	POLAND
YAL	YALE U., NEW HAVEN, CO NNECTICUT	USA

TABLE 5

REFERENCES

65ANTWRP	INT. CONF. ON THE STUDY OF NUCLEAR STRUCTURE WITH NEUTRONS, ANTWERP 19-23 JULY 1965. PROCEEDINGS GIVE FOR SOME PAPERS ABSTRACT ONLY. FOR FULL PAPERS SEE EANDC-50. FOR TECHNICAL MINUTES SEE EANDC-44	BELGIUM
65SALZBG	IAEA SYMPOSIUM ON PHYSICS AND CHEMISTRY OF FISSION, SALZBURG, AUSTRIA, 22-26 MARCH 1965. PREPRINT-CODE = SM-60/... PUBLISHED BY IAEA, VIENNA, JULY 1965 (STI/PUB/101)	IAEA
66PARIS	FIRST IAEA CONFERENCE ON NUCLEAR DATA FOR REACTORS PARIS, 17-21 OCT. 1966. PREPRINT-CODE = CN-23/... PROCEEDINGS PUBL. BY IAEA, VIENNA, 1967 (STI/PUB/140) SUPPLEMENT WITH ADDITIONAL PAPERS SEE INDC-156	IAEA
66WASH	CONFERENCE ON NEUTRON CROSS-SECTION TECHNOLOGY, WASHINGTON D.C. 22-24 MAR 1966, PUBL. AS AEC REPORT CONF-660303	USA
68DUBNA	UK-USSR SEMINAR ON NUCLEAR DATA FOR REACTOR COMPUTATIONS, DUBNA JUNE 1968	USSR
68WASH	2ND CONFERENCE ON NUCLEAR CROSS-SECTIONS AND TECH. WASHINGTON D.C. 4-7 MARCH 1968, PUBLISHED AS NBS SPECIAL PUBLICATION 299	USA
69VIENNA	IAEA SYMPOSIUM ON PHYSICS AND CHEMISTRY OF FISSION VIENNA JULY-AUGUST 1969, PUBLISHED 1969 AS STI/PUB/234	IAEA
70HELS	SECOND IAEA CONFERENCE ON NUCLEAR DATA FOR REACTORS HELSINKI, 15-19 JUNE 1970. PREPRINT-CODE = SM-122/.. PROCEEDINGS PUBL. BY IAEA, VIENNA, 1970 (STI/PUB/259)	IAEA
71ALBANY	INTERNATIONAL CONF. ON STATISTICAL PROPERTIES OF NUCLEI ALBANY 23-27 AUGUST, 1971	USA
71KNOX	3RD CONFERENCE ON NEUTRON CROSS-SECTIONS AND TECHNOLOGY. UNIVERSITY OF TENNESSEE. KNOXVILLE. 15-17 MARCH 1971	USA
AAEC/E-	AUSTRALIAN AEC REPORT SERIES	AUSTRALIA
AE	ATOMNAYA ENERGIYA /SJA/EAF/(/JNF/)	USSR
AE-	AKTIEBOLAGET ATOMENERGI, STOCKHOLM, REPORT SERIES	SWEDEN
AECL	ATOMIC EN. OF CAN. LIM., CHALK RIVER, REPORT SERIES	CANADA
AEEW	AEEW-WINFRITH REPORT SERIES	UK
AERE	AERE-HARWELL REPORT SERIES	UK
AF	ARKIV FOR FYSIK	SWEDEN
AFWL	AIR FORCE WEAPONS LAB., KIRTLAND, NEW MEXICO	USA
AHP	ACTA PHYS. ACAD. SCI. HUNG.	HUNGARY
AI	ATOMICS INTERNATIONAL, CANOGA PARK, CALIF. REPORTS.	USA
ANCR	AEROJET NUCLEAR COMPANY, IDAHO FALLS.	USA
ANL	ARGONNE NATN'L LABORATORY, REPORT SERIES	USA
ANS	TRANS. AMER. NUCL. SOC.	USA

AT.EM.REV.	SEE REA	
AWRE	AWRE-ALDERMASTON REPORT SERIES	UK
BAP	BULL. AM. PHYS. SOC.	USA
BARC	TROMBAY REPORT SERIES, FORMERLY AEET	INDIA
BNES	BRITISH NUCL. EN. SOC.- CONF. ON CHEMICAL NUCLEAR DATA-CANTERBURY	UK
BNL	BROOKHAVEN NATIONAL LABORATORY, REPORT SERIES	USA
CCDN	NEUTRON DATA COMP. CENTRE, SACLAY. REPORTS	FRANCE
CEA	CENTRE D'ETUDES NUCLEAIRES, SACLAY, REPORT SERIES	FRANCE
CEC	COM. NAZ. EN. NUCLEARE, INT'L REPORT SERIES	ITALY
CJP	CAN. J. PHYS. (FORMERLY CAN J. OF RESEARCH VOL I-28)	CANADA
CWR	CURTISS-WRIGHT CORP. REPORT SERIES. EXTINCT	USA
CZJ	CZECHOSLOVAK JOURNAL OF PHYSICS	CZECHOSLOVAKIA
DA	DISSERTATION ABSTRACTS	USA
DRP	C.E.A. CENTRE D'ETUDES NUCLEAIRES. FONTENAY-AUX-ROSES	FRANCE
DUB	DUBNA REPORT SERIES, ALSO KNOWN AS JINR-REPORTS	USSR
EANDC(CAN)	EUROPEAN-AMERICAN NUCL. DATA COMMITTEE DOCUMENTS	CANADA
EANDC(E)	EUROPEAN-AMERICAN NUCL. DATA COMMITTEE DOCUMENTS	EUROPE (6)
EANDC(J)	EUROPEAN-AMERICAN NUCL. DATA COMMITTEE DOCUMENTS	JAPAN
EANDC(OR)	EUROPEAN-AMERICAN NUCL. DATA COMMITTEE DOCUMENTS	OUTER REGION
EANDC(UK)	EUROPEAN-AMERICAN NUCL. DATA COMMITTEE DOCUMENTS	UK
EANDC(US)	EUROPEAN-AMERICAN NUCL. DATA COMMITTEE DOCUMENTS	USA
EUR	EURATOM REPORTS (FROM BCMN)	EURATOM
GA	GENERAL ATOMIC DIV. GEN. DYN.CORP., REPORT SERIES	USA
HNDC	UNKNOW	UK
HP	HEALTH PHYSICS	UK-USA
HPA	HELV. PHYS. ACTA	SWITZERLAND
IAE	REPORTS FROM INST. ATOMNOJ ENERGII, KURCHATOV, MOSKVA	USSR
IDO	IDAHO OPERATIONS OFFICE, AEC, REPORT SERIES	USA
IN	REPORTS IDAHO OP-OFFICE, AEC	USA
INDC	REPORTS IAEA NUCL. DATA UNIT, INT.NUCL.DATA COMMITTEE	IAEA
JAERI	ATOMIC ENERGY RESEARCH INST., TOKYO	JAPAN
JIN	J. INORG. NUCL. CHEM.	UK
JINR	DUBNA REPORT SERIES	USSR
JNE	J. NUCL. ENERG.	UK
KAPL	KNOLLS ATOMIC POWER LAB. REPORT SERIES	USA
KFK	KERNFORSCHUNGSZENTRUM KARLSRUHE REPORT SERIES	GERMANY

LA	LOS ALAMOS SCIENTIFIC LAB., REPORT SERIES	USA
LA-DC	LOS ALAMOS SCIENTIFIC LAB., REPORT SERIES	USA
NAT	NATURE	UK
NBS	NATIONAL BUREAU OF STANDARDS, WASHINGTON	USA
NC	NUOVO CIMENTO	ITALY
NCSAC	AEC NUCL., CROSS SECTION ADVISORY COMM.	USA
NIM	NUCLEAR INSTRUMENTS AND METHODS	NETHERLANDS
NP	NUCLEAR PHYSICS	NETHERLANDS
NSE	NUCL. SCI. ENG.	USA
NST	NUCLEAR SCIENCE AND TECHNOLOGY	JAPAN
NUCL	(OBSOLETE) NUCLEONICS	USA
NUCL.DATA	NUCLEAR-DATA - ACADEMIC PRESS	UK-USA
NUK	NUKLEONIK	GERMANY
OAWS	(PRFV.OAW) OESTERR.AKAD.WISS.,MATA + NATURW, SITZBER	AUSTRIA
ORNL	OAK RIDGE NATN' L. LAB., REPORT SERIES	USA
ORO	REPORTS OAK RIDGE OPERATIONS OFFICE, AEC	USA
PL	PHYSICS LETTERS	NETHERLANDS
PPS	PROC. PHYS. SOC. (LONDON)	UK
PR	PHYS. REV.	USA
PRL	PHYS. REV. LETTERS	USA
REA	ATOMIC ENERGY REVIEW	IAEA
RPI	RENNESLAER POLYTECHNIC INST. REPORTS	USA
SAE	UNKNOWN	USSR
TID	DIV. OF TECH. INFORM. EXT., AEC REPORT SERIES	USA
UCRL	CALIFORNIA U. REPORT SERIES	USA
UFZ	UKRAINSKIJ FIZICHNII ZHURNAL	USSR
USNRDL	NAVAL RADIOLOG. DEF.LAB., SANS FRANCISCO REP.SERIES	USA
WANL-TME	WESTINGHOUSE ASTRO-NUCLEAR LAB., PITTSBURG	USA
WAPD	WESTINGHOUSE, ATOMIC POWER DIV., REPORT SERIES	USA
WASH	AEC, WASHINGTON REPORTS TO THE NCSAG	USA
YF	YADERNAYA FIZIKA /SNP/	USSR
YFI	JADERNO-FIZICHESKIE ISSLEDOVANIJA (PROGRESS REPORTS)	USSR
ZET	ZH. EKSPERIM. I TEOR. FIZ. /JET/	USSR
ZP	Z. PHYSIK	GERMANY