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To: Distribution
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Subject: **Prompt fission neutron spectra**

Fission neutron spectrum is an important quantity in reactor applications. It was reported in the IAEA Consultant Meeting (November 2008) that the uncertainty in prompt fission neutron spectrum (PFNS) results in about 0.3% to 0.4% of the uncertainty in $k_{\rm eff}$ value in a sensitivity analysis of the JEZEBEL experiment. Importance of PFNS was also stressed in WPEC Subgroup 26.

However the current translator from EXFOR to C4 does not support fission neutron spectrum compiled in EXFOR; it is pointed out by several WPEC SG30 members that PFNS should be in the C4 library. In order to realize the translation for PFNS, however, we need clean up of the PFNS entries in EXFOR because the EXFOR quantity `PR,DE,N` is coded with various unit codes (`B/MEV`, 1/MEV etc.).

Type of measurement and normalization (useful for EXFOR compilation)

1. Detection type (TOF, proton recoil detector, fission detector)
2. Various normalizations
   - Relative (shape) spectrum
   - Absolute spectrum (neutrons/fiss/MeV) – neutron detection by ^{6}Li(n,t) or ^{235}U(n,f)
   - Absolute ratio of two spectra, e.g. ^{252}Cf(sf) PFNS / ^{235}U(n,f) PFNS
   - Shape of ratio of two spectra
   - Spectrum relative to Maxwellian spectrum with fixed *kT*

Most inconvenient is when authors used ^{252}Cf(sf) PFNS for determination of the efficiency detector, but not giving which standard was used foe ^{252}Cf(sf).

Note that coding of total kinetic energy and prompt neutron fission number as a function of fragment mass (K. Nishio *et al*.) should be also clarified in future.

Summary of prompt fission neutron quantities for EXFOR

(for discussion in the 2010 NRDC meeting, April 20-23, Sapporo)

NT1: New modifier for "normalized to 1" (Do you have a better one?)

PR: Branch code when prompt neutron is exclusively measured (time of flight measurement where fission event is used as the start signal)

(0) **98-CF-252(0,F),NU**

Prompt fission neutron multiplicity ν-bar (Unit: 1/FIS)

(1) **98-CF-252(0,F),,NU/DE**

PFNS $\chi(E)$, where. $\int \chi(E)dE = \bar{\nu}$ (Unit: PT/MEV/FIS)

Absolute multiplicity used for normalization should be coded under MONIT.

(2) **(92-U-235(N,F),,NU/DE)/(98-CF-252(0,F),,NU/DE)**

PFNS relative to the ^{252}Cf spontaneous PFNS

$\chi(E) / \chi_{252}(E)$, where $\int \chi(E)dE = \bar{\nu}$ and $\int \chi_{252}(E)dE = \bar{\nu}_{252} \sim 3.76$ (Unit: NO-DIM)

(3) **98-CF-252(0,F),,NU/DE,,MXD**

PFNS relative to Maxwell distribution $C\frac{\chi(E)}{\sqrt{E}\exp(-E/T)}$ (Unit: NO-DIM)

. Temperature should be coded under KT-NRM (or introduce a new quantity code?)

(4) **98-CF-252(0,F),,NU/DE,,NT1**

Normalized PFNS $X(E)$, where $\int X(E)dE = 1$ (Unit: 1/MEV/FIS)

(5) **(92-U-235(N,F),,NU/DE,,NT1)/(98-CF-252(0,F),,NU/DE,,NT1)**

Normalized PFNS relative to the normalized ^{252}Cf spontaneous PFNS

$X(E) / X_{252}(E)$, where $\int X(E)dE = 1$ and $\int X_{252}(E)dE = 1$ (Unit: NO-DIM)

(6) **98-CF-252(0,F),,NU/DE,,RTE**

$C\frac{\chi(E)}{\sqrt{E}}$ (Unit: NO-DIM, but always given in arbitrary unit)

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Prompt fission neutron spectrum (SF3=F, SF6=DE, SF7=N) in EXFOR (Preliminary result by Naohiko Otsuka)
(Type: Type of quantity, R: data in arbitrary unit)

Subentry	pt	Institute	Year	Emin	Emax	REACTION (current coding)	Unit (current	Type	Unit (new)	Remark
10612.002		1USAANL	1967	Spon		(98-CF-252(0,F),,DE,N,FCT)	1/MEV	6R?		N(E)/sqrt(E) compiled, N(E) is normalized to 1
10612.003		1USAANL	1967	Spon		(98-CF-252(0,F),,DE,N,FCT)	1/MEV	6R?		N(E)/sqrt(E) compiled, N(E) is normalized to 1
10612.004		1USAANL	1967	Spon		(98-CF-252(0,F),,DE,N,FCT)	1/MEV	6R?		N(E)/sqrt(E) compiled, N(E) is normalized to 1
10612.005		1USAANL	1967	Spon		(98-CF-252(0,F),,DE,N,FCT)	1/MEV	6R?		N(E)/sqrt(E) compiled, N(E) is normalized to 1
10612.006		1USAANL	1967	Spon		(98-CF-252(0,F),,DE,N,FCT)	1/MEV	6R?		N(E)/sqrt(E) compiled, N(E) is normalized to 1
10612.007		1USAANL	1967	Spon		(98-CF-252(0,F),,DE,N,FCT)	1/MEV	6R?		N(E)/sqrt(E) compiled, N(E) is normalized to 1
10614.002		1USABET	1973	Spon		(98-CF-252(0,F),PR,DE,N,FCT)	NO-DIM			log[N(E)/sqrt(E)] compiled, N(E)/Nmax(E) also in figure
10614.003		1USABET	1973	Spon		(98-CF-252(0,F),PR,DE,N,FCT)	NO-DIM			log[N(E)/sqrt(E)] compiled, N(E)/Nmax(E) also in figure
10614.004		1USABET	1973	Spon		(98-CF-252(0,F),PR,DE,N,FCT)	NO-DIM			log[N(E)/sqrt(E)] compiled, N(E)/Nmax(E) also in figure
10614.005		1USABET	1973	Spon		(98-CF-252(0,F),PR,DE,N,FCT)	NO-DIM			log[N(E)/sqrt(E)] compiled, N(E)/Nmax(E) also in figure
10614.006		1USABET	1973	Spon		(98-CF-252(0,F),PR,DE,N,FCT)	NO-DIM			log[N(E)/sqrt(E)] compiled, N(E)/Nmax(E) also in figure
10614.007		1USABET	1973	Spon		(98-CF-252(0,F),PR,DE,N,FCT)	NO-DIM			log[N(E)/sqrt(E)] compiled, N(E)/Nmax(E) also in figure
10911.002		1USAANL	1980	5.5e5		((92-U-233(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	(No data)	2R	ARB-UNITS	Digitize?
10911.003		1USAANL	1980	5.5e5		((92-U-235(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	(No data)	2R	ARB-UNITS	Digitize?
10911.004		1USAANL	1980	5.5e5		((94-PU-239(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	(No data)	2R	ARB-UNITS	Digitize?
10911.005		1USAANL	1980	8.3e5		((94-PU-240(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	(No data)	2R	ARB-UNITS	Digitize?
12727.002		1USAUI	1977	Spon		(98-CF-252(0,F),,DE,,REL)	ARB-UNITS	6R?	ARB-UNITS	Neutron flux /sqrt(E) (neutrons/cm2/sec/MeV**1.5)
12727.003		1USAUI	1977	Spon		(98-CF-252(0,F),,DE,,REL)	ARB-UNITS	6R?	ARB-UNITS	Neutron flux /sqrt(E) (neutrons/cm2/sec/MeV**1.5)
12727.004		1USAUI	1977	Spon		(98-CF-252(0,F),,DE,,REL)	ARB-UNITS	6R?	ARB-UNITS	Neutron flux /sqrt(E) (neutrons/cm2/sec/MeV**1.5)

13810.002		1USAANL	1952	Maxw		(92-U-235(N,F),,DE,N,MXW/REL)	1/MEV	1R	ARB-UNITS	
13824.002		1USALAS	1956	Maxw		(92-U-235(N,F),,DE,N,MXW/REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/sqrt(E) also in article in table
13824.003		1USALAS	1956	5.0e3	8.0e4	(92-U-235(N,F),,DE,N,AV/REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/sqrt(E) also in article in table
20175.003		2SWDAE	1977	5.3e5		(92-U-235(N,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E)/Nmax(E), N(E)/Nwat(E) also in figure
20385.003		2ZZZGEL	1973	4.0e5		(92-U-235(N,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/sqrt(E) also in figure
20394.008		2ZZZGEL	1972	1.5e6		(92-U-235(N,F),PR,DE,N)	B/MEV	6R	ARB-UNITS	N(E)/sqrt(E) compiled
20401.003		2ZZZGEL	1973	Spon		(98-CF-252(0,F),PR,DE,N)	1/MEV	1R	ARB-UNITS	N(E) compiled
20401.004		2ZZZGEL	1973	Spon		(98-CF-252(0,F),PR,DE,N)	1/MEV	1R	ARB-UNITS	N(E) compiled
20575.003		2SWDFOA	1965	4.0e4		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS	1R?	ARB-UNITS	N(E) compiled?
20575.004		2SWDFOA	1965	1.5e6		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS	1R?	ARB-UNITS	N(E) compiled?
20575.006		2SWDFOA	1965	4.0e4		(94-PU-239(N,F),,DE,N,REL)	ARB-UNITS	1R?	ARB-UNITS	N(E) compiled?
20575.008		2SWDFOA	1965	Spon		(98-CF-252(0,F),,DE,N,REL)	ARB-UNITS	1R?	ARB-UNITS	N(E) compield?
20576.003		2ZZZGEL	1975	2.2e5		(94-PU-239(N,F),PR,DE,N)	1/MEV	1R	ARB-UNITS	N(E) compiled
20616.003		2GERKFK	1971	Maxw		(92-U-235(N,F),,DE,N)	1/MEV	1R	ARB-UNITS	N(E) per lethargy converted to N(E) per MeV by compiler
20616.005		2GERKFK	1971	Maxw		(94-PU-239(N,F),,DE,N)	1/MEV	1R	ARB-UNITS	N(E) per lethargy converted to N(E) per MeV by compiler
20616.007		2GERKFK	1971	Spon		(98-CF-252(0,F),,DE,N)	1/MEV	1R	ARB-UNITS	N(E) per lethargy converted to N(E) per MeV by compiler
20996.003		2UK HAR	1975	5.2e5		(92-U-235(N,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/Nwat(E) also in table
20997.003		2FR CAD	1977	1.0e4	5.8e4	(92-U-235(N,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/Nwat(E) also in table
20997.004		2FR CAD	1977	1.0e4	5.8e4	(94-PU-239(N,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/Nwat(E) also in table
21465.002		2AUSATI	1979	Spon		(98-CF-252(0,F),PR,DE,N)	(No data)	1R, 3		N(E) and N(E)/Nmax(E) in figure
22112.002		2JPNTOH	1989	2.0e6		(92-U-238(N,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/Nmax(E), N(E)/Nwat(E) also in figure
22112.003		2JPNTOH	1989	2.0e6		(92-U-238(N,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/Nmax(E), N(E)/Nwat(E) also in figure
22112.004		2JPNTOH	1989	2.0e6		(90-TH-232(N,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/Nmax(E), NJ(E)/Nwat(E) also in figure
22202.003	1	2AUSIRK	1990	Spon		((98-CF-252(0,F),PR,DE,N,,EXP)/ (98-CF-252(0,F),PR,DE,N,,CALC))	NO-DIM	3	NO-DIM	

22202.003	2	2AUSIRK	1990	Spon		((98-CF-252(0,F),PR,DE,N,,EXP)/ (98-CF-252(0,F),PR,DE,N,,CALC))	NO-DIM	3	NO-DIM	
22202.004	1	2AUSIRK	1990	Spon		((98-CF-252(0,F),PR,DE,N,,EXP)/ (98-CF-252(0,F),PR,DE,N,,CALC))	NO-DIM	3	NO-DIM	
22202.004	2	2AUSIRK	1990	Spon		((98-CF-252(0,F),PR,DE,N,,EXP)/ (98-CF-252(0,F),PR,DE,N,,CALC))	NO-DIM	3	NO-DIM	
22219.002		2GERDRE	1990	Spon		((98-CF-252(0,F),PR,DE,N,,EXP)/ (98-CF-252(0,F),PR,DE,N,,CALC))	NO-DIM	3	NO-DIM	=30969.004
22219.003		2GERDRE	1990	Spon		(98-CF-252(0,F),PR,DE,N)	1/MEV	4	1/FIS/MEV	=30969.002 N(E):Emission probability
22219.004		2GERDRE	1990	Spon		((98-CF-252(0,F),PR,DE,N,,EXP)/ (98-CF-252(0,F),PR,DE,N,,CALC))	NO-DIM	3	NO-DIM	=30969.005
22219.005		2GERDRE	1990	Spon		(98-CF-252(0,F),PR,DE,N)	1/MEV	4	1/FIS/MEV	=30969.003 N(E):Emission probability
22464.002		2JPNKTO	1998	Maxw		(92-U-235(N,F)MASS,PR,DE,N,FCT/MXW)	ARB-UNITS		ARB-UNITS	N(E,Af)/sqrt(E) in fragment c.m.s. compiled
22650.007	1	2JPNKTO	2000	Maxw		(94-PU-239(N,F)MASS,PR,DE,N,REL/MXW)	ARB-UNITS		ARB-UNITS	N(E,Af)sqrt(E) in fragment c.m.s compiled
22650.007	2	2JPNKTO	2000	Maxw		(94-PU-239(N,F)MASS,PR,DE,N,FCT/MXW)	ARB-UNITS		ARB-UNITS	N(E,Af)/sqrt(E) in fragment c.m.s. compiled
22660.002		2JPNKTO	1998	Maxw		(92-U-233(N,F)MASS,PR,DE,N,FCT/MXW)	ARB-UNITS		ARB-UNITS	N(E,Af)/sqrt(E) in fragment c.m.s. compiled
22688.002		2JPNTOH	2002	5.5e5		(92-U-233(N,F),PR,DE,N,FCT)	MB/MEV	1R	ARB-UNITS	
23056.009		2ZZZGEL	2007	5.2e5		(92-U-235(N,F),PR,DE,N,MXD)	(No data)	3	NO-DIM	Preliminary data
23056.010		2ZZZGEL	2007	5.2e5		(92-U-235(N,F),PR,DE,N)	(No data)	3	NO-DIM	Preliminary data
30099.002		3HUNKFI	1971	Spon		(98-CF-252(0,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled
30099.003		3HUNKFI	1971	Spon		(98-CF-252(0,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, derived from 30099.002?
30426.002		3HUNKFI	1977	Maxw		(92-U-235(N,F),PR,DE,N,MXW/FCT)	PT/RCT/MEV		P/FS/MEVSR	N(E) in neutrons/MeV/sr, Detector angle not given
30704.002		3HUNKFI	1985	Maxw		(92-U-233(N,F),PR,DE,N,MXW/REL)	ARB-UNITS	1R?	ARB-UNITS?	N(E)/Nmax(E) also in figure
30704.003		3HUNKFI	1985	Maxw		(92-U-235(N,F),PR,DE,N,MXW/REL)	ARB-UNITS	1R?	ARB-UNITS?	N(E)/Nmax(E) also in figure
30704.004		3HUNKFI	1985	Maxw		(94-PU-239(N,F),PR,DE,N,REL,MXW)	ARB-UNITS	1R?	ARB-UNITS?	N(E)/Nmax(E) also in figure
30775.002		3AULAUA	1986	Spon		(98-CF-252(0,F),PR,DE,N,MXD)	NO-DIM	3	NO-DIM	
30775.003		3AULAUA	1986	Spon		(98-CF-252(0,F),PR,DE,N,MXD)	NO-DIM	3	NO-DIM	
30969.002		3DDRTUD	1990	Spon		(98-CF-252(0,F),PR,DE,N)	1/MEV	4	1/FIS/MEV	=22219.003 N(E):Emission probability
30969.003		3DDRTUD	1990	Spon		(98-CF-252(0,F),PR,DE,N)	1/MEV	4	1/FIS/MEV	=22219.005 N(E): Emission probability
30969.004		3DDRTUD	1990	Spon		(98-CF-252(0,F),PR,DE,N,MXD)	NO-DIM	3	NO-DIM	=22219.002
30969.005		3DDRTUD	1990	Spon		(98-CF-252(0,F),PR,DE,N,MXD)	NO-DIM	3	NO-DIM	=22219.004
31405.003		3CPRBJG	1989	Spon		(98-CF-252(0,F),PR,DE,N,REL)	ARB-UNITS	3	NO-DIM	

31440.003		3BZLIPE	1989	Spon		(98-CF-252(0,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled
32211.002		4UKRIJD	2004	Maxw		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS			Reactor neutron spectra. Delete.
32211.003		4UKRIJD	2004	Maxw		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS			Reactor neutron spectra. Delete.
32211.004		4UKRIJD	2004	Maxw		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS			Reactor neutron spectra. Delete.
32211.005		4UKRIJD	2004	Maxw		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS			Reactor neutron spectra. Delete.
32211.006		4UKRIJD	2004	Maxw		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS			Reactor neutron spectra. Delete.
32587.002		3CPRAEP	1989	Maxw		(92-U-235(N,F),PR,DE,N,MXW/REL)	1/MEV	1R	ARB-UNITS	N(E) compiled?, N(E)/Nmax(E) also in figure
40137.002		4RUSRI	1968	Spon		(96-CM-244(0,F),,DE,N,REL)	ARB-UNITS	1R?	ARB-UNITS?	
40137.003		4RUSRI	1968	Spon		(94-PU-242(0,F),,DE,N,REL)	ARB-UNITS	1R?	ARB-UNITS?	
40137.004		4RUSRI	1968	Maxw		(94-PU-239(N,F),,DE,N,REL)	ARB-UNITS	1R?	ARB-UNITS?	
40250.002		4RUSFEI	1974	Spon		(98-CF-252(0,F),PR,DE,N,RTE/REL)	ARB-UNITS	6R	ARB-UNITS	N(E)/sqrt(E) PR,DE,N,RTE is used in this subentry only
40358.002		4RUSFEI	1975	1.0e5		(94-PU-239(N,F),,DE,N,REL)	ARB-UNITS	6R	ARB-UNITS	N(E)/sqrt(E)
40358.003		4RUSFEI	1975	1.0e5		(94-PU-239(N,F),,DE,N,REL)	ARB-UNITS	6R	ARB-UNITS	N(E)/sqrt(E)
40358.004		4RUSFEI	1975	1.0e5		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS	6R	ARB-UNITS	N(E)/sqrt(E)
40358.005		4RUSFEI	1975	1.0e5		(92-U-235(N,F),,DE,N,REL)	ARB-UNITS	6R	ARB-UNITS	N(E)/sqrt(E)
40418.002		4RUSRI	1977	Spon		(98-CF-252(0,F),,DE,N,REL)	ARB-UNITS	1R?	ARB-UNITS?	
40472.003		4RUSFEI	1975	Spon		(98-CF-252(0,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled
40535.002		4RUSRI	1980	Spon		(98-CF-252(0,F),PR,DE,N,MXD)	NO-DIM	3	NO-DIM	
40631.002		4RUSFEI	1980	6.0e6		(92-U-238(N,F),PR,DE,N)	1/MEV	1?	PT/FIS/MEV?	“Absolute measurement”
40631.003		4RUSFEI	1980	7.0e6		(92-U-238(N,F),PR,DE,N)	1/MEV	1?	PT/FIS/MEV?	“Absolute measurement”
40631.004		4RUSFEI	1980	8.0e6		(92-U-238(N,F),PR,DE,N)	1/MEV	1?	PT/FIS/MEV?	“Absolute measurement”
40631.005		4RUSFEI	1980	8.9e6		(92-U-238(N,F),PR,DE,N)	1/MEV	1?	PT/FIS/MEV?	“Absolute measurement”
40644.002		4RUSNIR	1979	Spon		(98-CF-252(0,F),,DE,,REL)	NO-DIM	4	NO-DIM	“Relative to the total number”
40740.002		4RUSFEI	1979	1.4e7		(92-U-238(N,F),PR,DE,N)	1/MEV	1?	PT/FIS/MEV?	“Absolute measurement”
40871.005		4RUSNIR	1983	Spon		(98-CF-252(0,F),PR,DE,N)	PT/FIS/MEV	1	PT/FIS/MEV	See Pronyaev memo
40871.006		4RUSNIR	1983	Maxw		(94-PU-239(N,F),PR,DE,N,MXW)	PT/FIS/MEV	1	PT/FIS/MEV	
40871.007		4RUSNIR	1983	Maxw		(92-U-235(N,F),PR,DE,N,MXW)	PT/FIS/MEV	1	PT/FIS/MEV	See Pronyaev memo
40871.008		4RUSNIR	1983	Maxw		(92-U-235(N,F),PR,DE,N,MXW)	PT/FIS/MEV	1	PT/FIS/MEV	See Pronyaev memo
40871.009		4RUSNIR	1983	Maxw		((98-CF-252(0,F),PR,DE,N)// (94-PU-239(N,F),PR,DE,N,MXW))	NO-DIM	2	NO-DIM	
40871.010		4RUSNIR	1983	Maxw		((98-CF-252(0,F),PR,DE,N)//	NO-DIM	2	NO-DIM	

						(94-PU-239(N,F),PR,DE,N,MXW))				
40871.011		4RUSNIR	1983	Maxw		((98-CF-252(0,F),PR,DE,N)// (92-U-235(N,F),PR,DE,N,MXW))	NO-DIM	2	NO-DIM	See Pronyaev memo
40871.012		4RUSNIR	1983	Maxw		((98-CF-252(0,F),PR,DE,N)// (92-U-235(N,F),PR,DE,N,MXW))	NO-DIM	2	NO-DIM	See Pronyaev memo
40871.013		4RUSNIR	1983	Maxw		((98-CF-252(0,F),PR,DE,N)// (92-U-233(N,F),PR,DE,N,MXW))	NO-DIM	2	NO-DIM	
40872.002		4RUSNIR	1983	Spon		(98-CF-252(0,F),PR,DE,N)	PT/FIS/MEV	1	PT/FIS/MEV	See Pronyaev memo
40872.003		4RUSNIR	1983	Maxw		(94-PU-239(N,F),PR,DE,N,MXW)	PT/FIS/MEV	1	PT/FIS/MEV	See Pronyaev memo
40872.004		4RUSNIR	1983	Maxw		(92-U-235(N,F),PR,DE,N,MXW)	PT/FIS/MEV	1	PT/FIS/MEV	See Pronyaev memo
40872.005		4RUSNIR	1983	Maxw		(92-U-233(N,F),PR,DE,N)	PT/FIS/MEV	1	PT/FIS/MEV	
40872.006		4RUSNIR	1983	Maxw		((98-CF-252(0,F),PR,DE,N)// (94-PU-239(N,F),PR,DE,N,MXW))	NO-DIM	2	NO-DIM	
40872.007		4RUSNIR	1983	Maxw		((98-CF-252(0,F),PR,DE,N)// (92-U-235(N,F),PR,DE,N,MXW))	NO-DIM	2	NO-DIM	See Pronyaev memo
40872.008		4RUSNIR	1983	Maxw		((98-CF-252(0,F),PR,DE,N)// (92-U-233(N,F),PR,DE,N,MXW))	NO-DIM	2	NO-DIM	
40873.002		4RUSNIR	1983	Maxw		(92-U-233(N,F),PR,DE,N,REL)	NO-DIM	3	NO-DIM	
40873.004		4RUSNIR	1983	Maxw		(92-U-235(N,F),PR,DE,N,REL)	NO-DIM	3	NO-DIM	See Pronyaev memo
40873.006		4RUSNIR	1983	Maxw		(94-PU-239(N,F),PR,DE,N,REL)	NO-DIM	3	NO-DIM	See Pronyaev memo
40874.002		4RUSNIR	1983	Spon		(98-CF-252(0,F),PR,DE,N,REL)	ARB-UNITS	1	PT/FIS/MEV	See Pronyaev memo
40874.003		4RUSNIR	1983	Spon		(98-CF-252(0,F),PR,DE,N,REL)	NO-DIM	3	NO-DIM	See Pronyaev memo
40874.004		4RUSNIR	1983	Spon		(98-CF-252(0,F),PR,DE,N,REL)	NO-DIM	3	NO-DIM	See Pronyaev memo
40875.002		4RUSFEI	1983	Spon		(98-CF-252(0,F),PR,DE,N,REL)	ARB-UNITS		P/FS/MEVSR	
40875.003		4RUSFEI	1983	Spon		((98-CF-252(0,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	NO-DIM	3	NO-DIM	
40916.002		4RUSFEI	1986	1.5e6		(90-TH-232(N,F),PR,DE,N)	1/MEV		B/MEV	DDX(90deg)*4pi
40930.002		4RUSNIR	1985	Spon		((98-CF-252(0,F),PR,DE,N,,EXP)// (98-CF-252(0,F),PR,DE,N,,CALC))	NO-DIM	3	NO-DIM	See Pronyaev memo
40930.004		4RUSNIR	1985	Maxw		((92-U-233(N,F),PR,DE,N,MXW,EXP)// (92-U-233(N,F),PR,DE,N,MXW,CALC))	(No data)	3	NO-DIM	Digitize?
40930.006		4RUSNIR	1985	Maxw		((92-U-235(N,F),PR,DE,N,MXW,EXP)// (92-U-235(N,F),PR,DE,N,MXW,CALC))	(No data)	3	NO-DIM	Digitize?
40930.008		4RUSNIR	1985	Maxw		((94-PU-239(N,F),PR,DE,N,MXW,EXP)/ (94-PU-239(N,F),PR,DE,N,MXW,CALC))	(No data)	3	NO-DIM	Digitize?
41110.008	1	4RUSFEI	1991	2.9e6	1.5e7	((90-TH-232(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	NO-DIM	5	NO-DIM	
41110.008	2	4RUSFEI	1991	2.9e6	1.5e7	(90-TH-232(N,F),PR,DE,N,REL)	ARB-UNITS	4	1/FIS/MEV	

41110.009	1	4RUSFEI	1991	2.9e6	1.5e7	((92-U-235(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	NO-DIM	5	NO-DIM	
41110.009	2	4RUSFEI	1991	2.9e6	1.5e7	(92-U-235(N,F),PR,DE,N,REL)	ARB-UNITS	4	1/FIS/MEV	
41110.010	1	4RUSFEI	1991	2.9e6	1.5e7	((92-U-238(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	NO-DIM	5	NO-DIM	
41110.010	2	4RUSFEI	1991	2.9e6	1.5e7	(92-U-238(N,F),PR,DE,N,REL)	ARB-UNITS	4	1/FIS/MEV	
41113.003		4RUSRI	1991	Spon		(96-CM-248(0,F),PR,DE,N,REL)	NO-DIM	3	NO-DIM	
41132.003		4RUSLIN	1981	1.4e7		(93-NP-237(N,F),PR,DE,N)	1/MEV	1R?	ARB-UNITS?	N(E) compiled
41132.004		4RUSLIN	1981	1.4e7		(93-NP-237(N,F),PR,DE,N)	1/MEV	1R?	ARB-UNITS?	N(E) compiled
41158.002		4RUSFEI	1990	Spon		(98-CF-252(0,F),PR,DE,N,REL)	ARB-UNITS	1R	ARB-UNITS	N(E) compiled, N(E)/Nmax(E) also in Table
41332.002		4RUSFEI	1997	5.2e5		(93-NP-237(N,F),PR,DE,N)	PT/FIS/MEV	1	PT/FIS/MEV	
41421.002		4RUSRI	2002	Spon		((94-PU-240(0,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	(No data)	2	NO-DIM	ISTC #183B-96; Digitize?
41421.003		4RUSRI	2002	Spon		((94-PU-242(0,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	(No data)	2	NO-DIM	ISTC #183B-96; Digitize?
41446.004		4RUSFEI	2004	1.5e7	1.8e7	((90-TH-232(N,F),PR,DE,N)/ (98-CF-252(0,F),,DE,N))	NO-DIM	5	NO-DIM	
41447.003		4RUSFEI	2004	6.0e6	7.0e6	((92-U-238(N,F),PR,DE,N)/ (98-CF-252(0,F),,DE,N))	NO-DIM	5	NO-DIM	
41450.003		4RUSFEI	2001	5.0e6	1.3e7	((92-U-238(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	NO-DIM	5	NO-DIM	
41461.004		4RUSFEI	1996	1.6e7	1.8e7	((92-U-238(N,F),PR,DE,N)/ (98-CF-252(0,F),PR,DE,N))	NO-DIM	5	NO-DIM	
41502.002		4RUSLIN	2004	Maxw		((92-U-235(N,F),PR,DE,N)/ (98-CF-252(N,F),PR,DE,N))	NO-DIM	2	NO-DIM	
41502.003		4RUSLIN	2004	Maxw		((94-PU-239(N,F),PR,DE,N)/ (98-CF-252(N,F),PR,DE,N))	NO-DIM	2	NO-DIM	
41502.004		4RUSLIN	2004	3.0e-1		((94-PU-239(N,F),PR,DE,N)/ (98-CF-252(N,F),PR,DE,N))	NO-DIM	2	NO-DIM	
41516.007		4RUSLIN	2009	Maxw		(92-U-235(N,F),PR,DE,N,MXD/MSC)	NO-DIM		NO-DIM	N(E,LF)/Nmax
41516.008		4RUSLIN	2009	Maxw		(92-U-235(N,F),PR,DE,N,MXD/MSC)	NO-DIM		NO-DIM	N(E,HF)/Nmax