2011/12 Status Report of China Nuclear Data Center

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CHINA NUCLEAR DATA CENTER

1. General Information of CNDC

CNDC View

China Nuclear Data Center (CNDC) was established in 1975 and joined the nuclear data activities of IAEA as the national nuclear data center of China since 1984.

The main task of CNDC:

- ✓ The nuclear data evaluations, libraries and relevant technique researches.
- ✓ The exchange of nuclear data activities with IAEA, foreign nuclear data centers and agencies.
- ✓ The management of domestic nuclear data activities.
- ✓ The services for domestic and foreign nuclear data users.

1-1 Manpower Information of CNDC

CNDC consists of the four units + an office:

Evaluation Unit	*Head: Dr. Huang Xiaolong*	*3 official staff*
Theory Unit	*Head: Dr. Ge Zhigang*	*6 official staff*
Macroscopic Data Unit	*Head: Dr. Liu Ping*	*4 official staff*
Data Library Unit	*Head: Dr. Shu Nengchuan*	*5 official staff*
Secretary Office		*2 official staff*

- One young staff left CNDC for State Nuclear Power Technology Corporation from macroscopic data unit. Two moved to the Uppsala Univ. Sweden and Japan from theory unit.
- 3 graduated students joined CNDC for their master degree in last year, and 3~4 will come in this autumn.
- 20 official staff + 5 technical support seniors (retired staff) + 5 graduated students.

1-2 Mainly tasks of CNDC in 2011:

- CENDL re-evaluations and new plan.
- Nuclear data evaluation for Th-U fuel cycling studies.
- Nuclear data studies for ADS needs.
- Nuclear structure and decay data evaluation-ENDSF.
- EXFOR compilation-NRDC.
- Nuclear data methodology studies.
- The benchmark/validation of nuclear data libraries (CENDL-3.1, ENDF/B-VII,JENDL-4. JEFF etc.).

1-3 Activities information

- The twelfth five year plan of nuclear data project (incl. nuclear data evaluations and measurements) was approved and started for 2011.
- The upgrade application of the computer system (parallel computing system) of CNDC was approved and executing program is making.
- 2011 China Nuclear Data Conference was held in Beijing in 2011 Aug. 25-26 and more than 100 participants from China attended this conference, more than 80 presentations received.
- 2nd Asian Nuclear Reaction Database Development Workshop hosted by CNDC/CIAE in Sept. 5-9 2011 in Beijing and 28 participants from China, Japan, Korea, India and IAEA/NDS and 23 presentations coved six aspect: reaction data center introduction, future nuclear need and development, nuclear data evaluation and measurements, EXFOR compile, corporation with IAEA and among the Asia nuclear data centers. The next (3rd) workshop will be hosted by Korea in 2012.
- Head of IAEA/NDS Dr. Robin A. Forrest visited CNDC Oct. 9-15, 2011 and discussed the Agreement between IAEA and CNDC concerning the mirror of IAEA/NDS website in China.

2nd Asian Nuclear Reaction Database Development Workshop held in Beijing

2. Nuclear data evaluation and methodological studies

2-1 CENDL Project

- Some data files of CENDL-3.1 re-evaluated according to the updated experimental information and back feed from the benchmark testing and validation.
- The number of nuclei of next vision of CENDL will be increased from 240 up to 300 according to the user's requirements.
- The covariance files will be added for more than 30 nuclei, the high reliability covariance for important nuclei and low reliability for other will be included.
- The some sub-libraries (fission product yield data sub-library, activity cross section sub-library and charged-particle nuclear data sub-library et al.) will be included in the next CENDL.
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2-2 Structure and decay data evaluation

Mass Chain Evaluation

- The NSDD group in CNDC has permanent responsibility for evaluating and updating NSDD for A=51,195-198; temporary for A= 67 and 174. In recent 2 years, the mass chain A=174, 195 and 198 have been revised using available experimental decay and reaction data. A=198 was published in NDS in 2009. Now A=174 and 195 are being updated.
- The NSDD group in Jilin University (JLU) has permanent responsibility for evaluating and updating NSDD for A=52, 53, 54, 55, 56, 62, and 63. In recent 2 years, A=53, 56 and 63 have been revised using available experimental decay and reaction data. A=62 is being evaluated by Dr. B.Singh et al.,.

Decay Data Measurement and Evaluation

- The decay data for ^{56}Co, ^{66}Ga, ^{213}Bi, ^{213}Po,^{217}At, ^{217}Rn, ^{221}Fr, ^{223}Fr, ^{225}Ac, ^{225}Ra, ^{231}Th, ^{234,234m}Pa, ^{235}U nuclides have been updated and recommended using available experimental data. The recommended data and evaluated comments were published in DDEP website.

2-3 Neutron CS covariance evaluation & nuclear data S/U method study.

A covariance evaluation system, COVAC, is being developed in CNDC to achieve the covariance files mainly for structure and fission nuclides. In this system, experimental data including their errors were firstly pre-analyzed and handled via available tools. In this framework, the high fidelity covariance file can be obtained with combining the theoretical and experimental uncertainties and correlations.

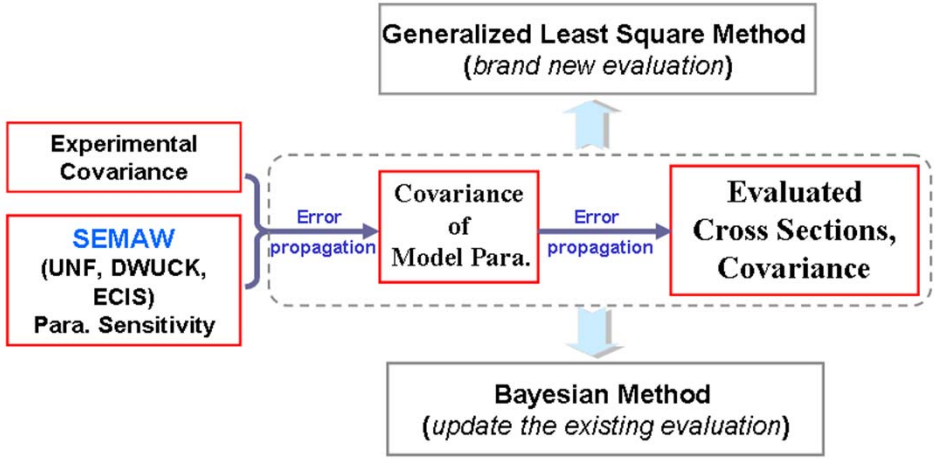
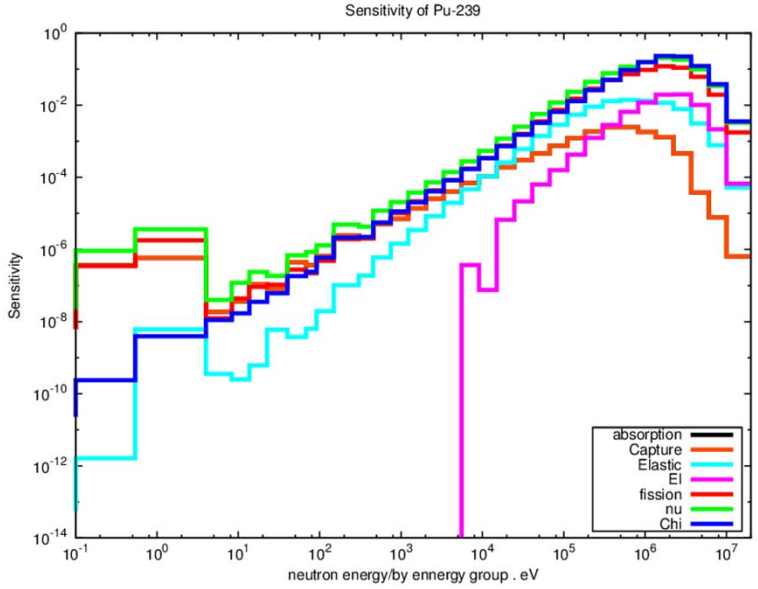


Fig. COVAC SYSTEM OF CNDC

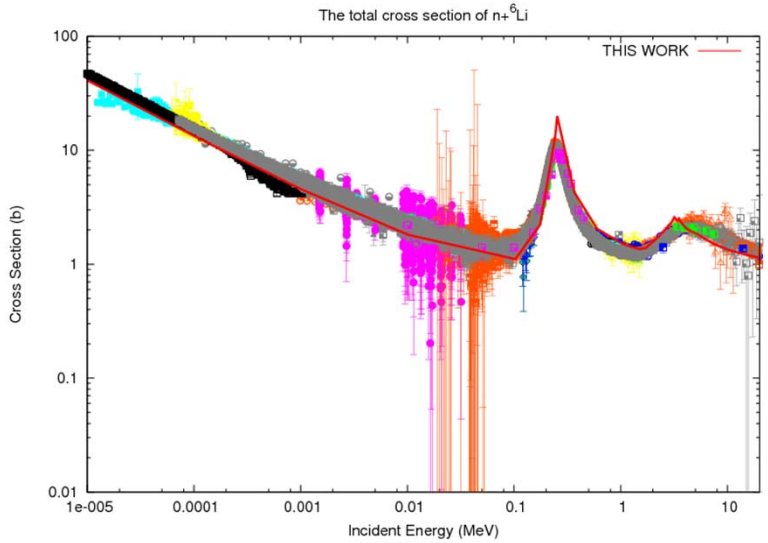
- A one-dimension sensitivity/uncertainty(S/U) analysis code SENS1D, based on the generalized perturbation theory, has been developed, which can be used for the S/U analysis of one-dimension benchmark facilities, such as Godiva, Jezebel and Flattop, with or without reflecting material. SENS1D can now calculate the explicit sensitivity coefficient of K_{eff} to several input CS data, including fission, absorption, scattering and total (absorption plus scattering plus n-f), and then combine the multi-group covariance data to calculate the uncertainty of k_{eff}.



Preliminary k_{eff} sensitivity coefficient of ^{239}Pu (absolute value) calculated by SENS1D

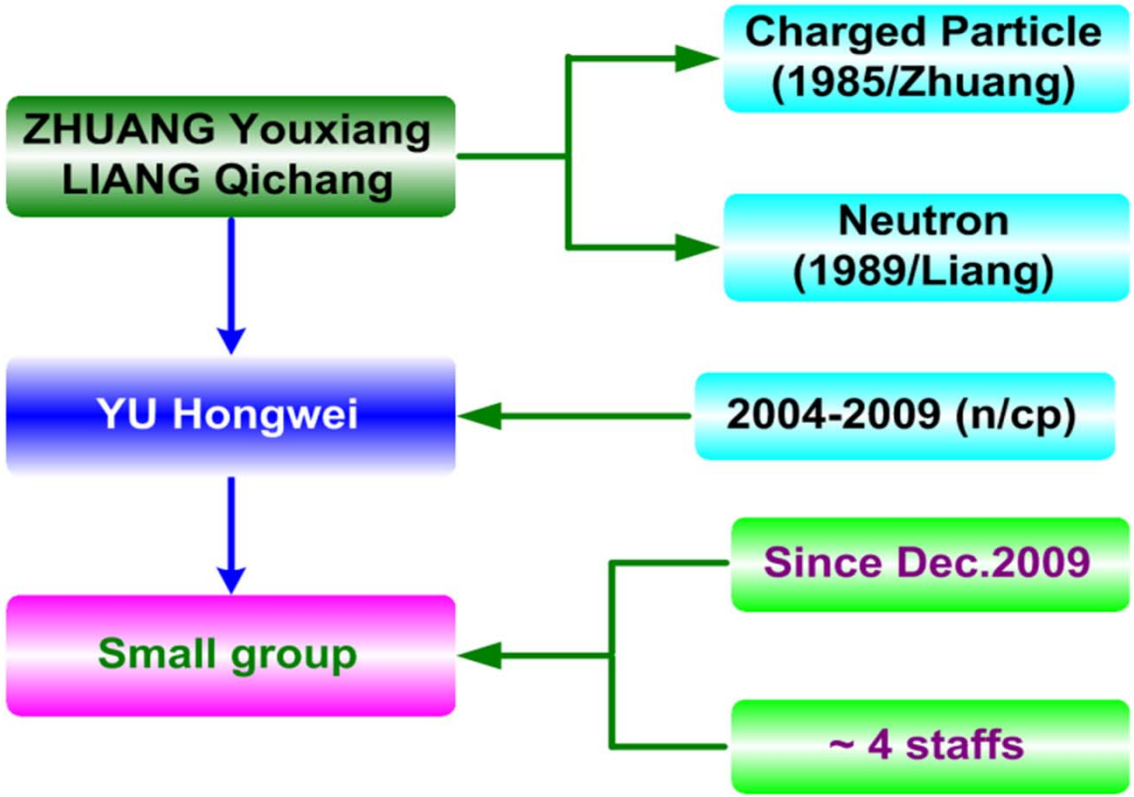
2-4 R- matrix used for light nuclei CS evaluation.

APRML is a nuclear reaction code for calculating and fitting light nuclei cross sections, developed at CNDC and Nankai University. It is based on R-matrix theory. It can be used for calculating light nuclei cross section and angular distribution. APRML was compiled and adjusted less than a year, many mistakes and bugs have been fixed. The code has been compiled and some functions are under debugging and testing.

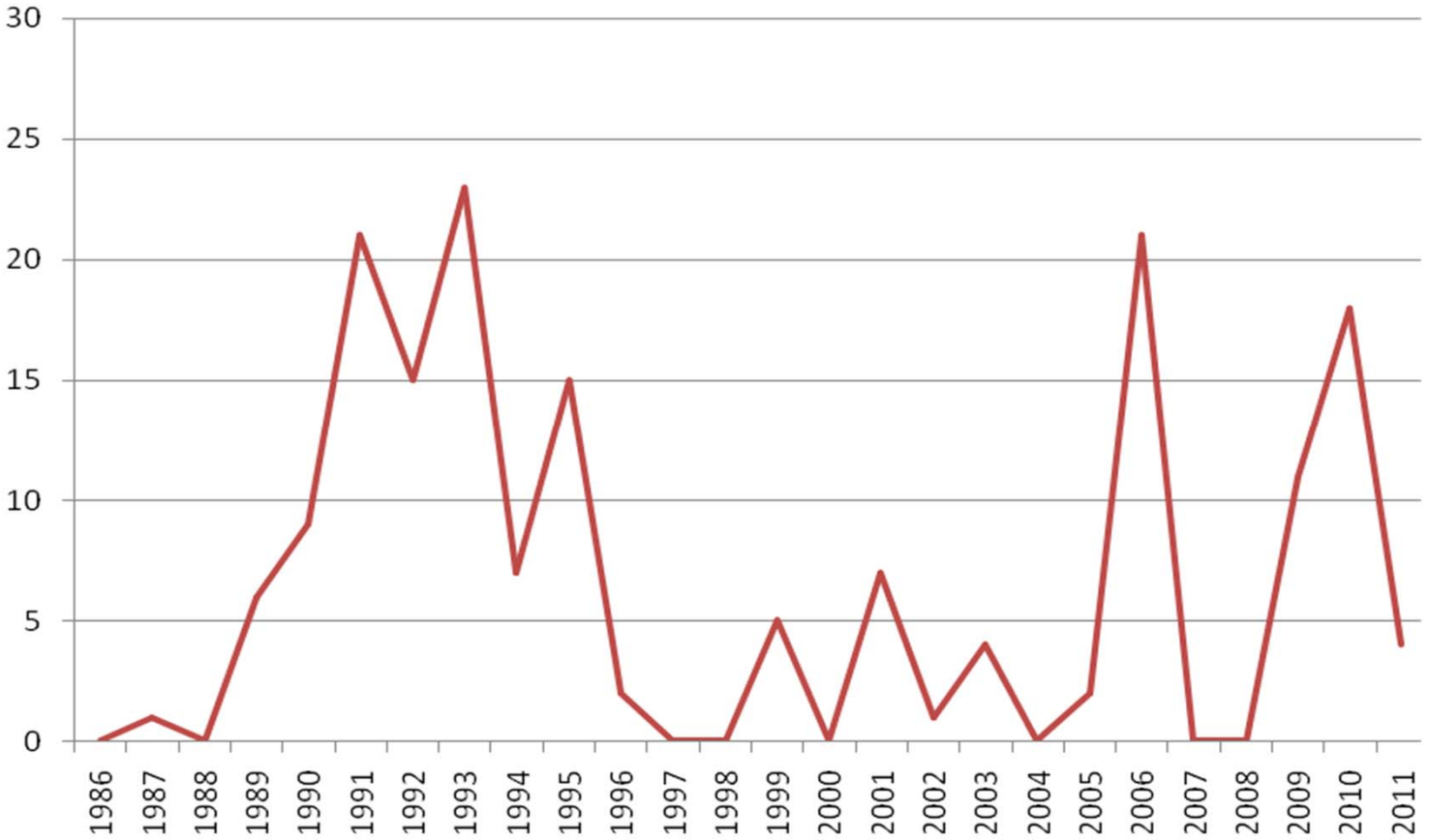


The comparisons of the preliminary calculation and experimental data of total CS for n+^{6}Li

3. EXFOR database compilation progress



Difference phase activities of EXFOR at CNDC



The number of EXFOR entries compiled by CNDC since 1986

During the 2010-2011 EXFOR compile group at CNDC have finished the 34 new entries compilation (18 entries compiled in 2010 and 16 in 2011), which contains 11 charged particles and 23 neuron introduced reactions experiments. These experiments were finished by Chinese and published in the journals and proceedings:

In the past two years, CNDC also corrected 6 files in the EXFOR database.

No.	Ref.	Title	Vol.	Issue	Page	Lab	Publish date	Author	Status	Action	Delay date(m)	Compiler	Entry	Sub.	Memo
1	J,CPL	Angular Distribution of the 12C(6He, 7Li)11B Reaction	26	7	72401	3CPRAEP	200907	Li Er-Tao	Allocated	Finalized	12	Hongwei YU	S0052	cp	
2	J,CPL	Optical Potential Parameters for Halo Nucleus System 6He+12C from Transfer Reaction 11B(7Li, 6He)12C	26	7	22503	3CPRAEP	200902	Wu Zhen-Dong	Allocated	Finalized	18	Zhendong WU	S0056	cp	
3	J,CPL	Quasi-Elastic Scattering of 16C from 12C at 47.5 MeV/Nucleon	26	8	82501	3CPRBJG	200908	FAN Feng-Ying	Allocated	Finalized	21	Youxiang ZHUANG	S0059	cp	Accepted by NDS at 2 …
4	J,CNPR	Study of Proton Resonances in 22Mg by Resonant Elastic Scattering of 21Na+p and Its Astrophysical Implication in 18Ne(a,p)21Na Reaction Rate	26	s1	153	3CPRIMP	200907	HE Jian-jun	Allocated	Finalized	13	Youxiang ZHUANG		cp	It has been assigned …
5	J,CST	Measurement of Secondary Neutron Emission Double Differential Cross Section for Natural Iron Induced by 8.17 MeV Neutron	43	9	793-797	3CPRAEP	200909	Xichao RUAN	Allocated	Finalized	11	Guochang CHEN	32673	n	
6	J,ARI	Cross-Section Measurement for the 95Mo(n,a)92Zr Reaction at 4.0, 5.0 and 6.0 MeV 文献2	68	1	180	3CPRBJG	201001	Guohui ZHANG	Allocated	Finalized	9	Jimin WANG	32676	n	
7	J,CPL	Excited States in 18Ne Studied via 17F+p	27	3	32102	3CPRAEP	201003	JIN Sun-Jun(金孙均)	Allocated	Finalized	5	Zhendong WU	S0057	cp	
8	J,CPL	Experimental Study on the Exotic Structure of 12N in RIBLL	27	3	32501	3CPRLNZ	201003	LI Jia-Xing(李加兴)	Allocated	Finalized	5	Guochang CHEN	S0064	cp	
9	J,CPL	Neutron Spectroscopic Factors of 7Li and Astrophysical 6Li(n,g)7Li Reaction Rates	27	5	52101	3CPRAEP	201005	SU Jun(苏俊)	Allocated	Finalized	3	Zhendong WU	S0065	cp	
10	J,PR/C	Cross section of the 67Zn(n, α)64Ni reaction at 4.0, 5.0 and 6.0 MeV	82	054619	1-4	3CPRBJG	201011	Guohui Zhang	Allocated	Finalized	14	Guochang CHEN	32689	n	Update the Ref. & His …

The list(part) of the EXFOR compilations finished by CNDC in recent years

An EXFOR compilation management system and a digital graph software have been developed at CNDC and used in the EXFOR compilations.

CNDC 中国核数据中心

首页 查询 我的任务 字典 备忘录 欢迎guest! 退出

	No.	Ref.	Title	Vol.	Issue	Page	Lab	Publish date	Author	Status	Action	Delay date(m)	Compiler	Entry	Sub.
详情	1	S,JAEA-C-	Preliminary Measurement of Neutron Emission Spectra for Beryllium at 21.65 MeV	JAEA-Conf-2009-004	2009-004	169	3CPRAEP	200910	Changlin LAN	Allocated	Compiled	10	Guochang CHEN	32682	n
详情	2	S,ISINN-	Cross section measurements for the 143Nd(n,α)140Ce reaction at 4.0, 5.0 and 6.0 MeV	17	1	323	3CPRBJG	201007	Yu.M.Gledenov	Allocated	Compiled	1	Guochang CHEN	32681	n
详情	3	S,ISINN-	Cross section measurements for the 143Nd(n,α)140Ce reaction at 4.0, 5.0 and 6.0 MeV	17	1	323	3CPRBJG	201007	Yu. M. Gledenov	Allocated	Compiled	1	Guochang CHEN	32681	n
详情	4	J,RCA	Cross section measurements of (n, 2n), (n, p) and (n, α) reactions on gadolinium isotopes in the neutron energy range of 13.5 to 14.8 MeV 文献2	98	3	127	3CPRNPC	201003	Junhua Luo	Allocated	Compiled	6	Guochang CHEN	32680	n
详情	5	J,PR/C	Cross-section measurement and analysis for the 149 Sm(n,α) 146 Nd reaction at 6.0 MeV	82	1	14601	3CPRBJG	201007	Yu. M. Gledenov	Allocated	Compiled	1	Jimin WANG	32679	n
详情	6	J,NP/A	Lithium induced nuclear reactions of astrophysical interest	834	1-4	651c	3CPRAEP	201003	W.P.Liu	Allocated		7	Xi TAO	S0070	cp
详情	7	J,NP/A	Competition between fusion-fission and quasi fission processes in 32S+184W reaction	834	1-4	201c	3CPRAEP	201003	C. L. Zhang	Allocated		7		S0069	cp
详情	8	J,NP/A	Elastic resonance scattering of 13N+p and 17F+p	834	1-4	100c	3CPRAEP	201003	Y.B. Wang	Allocated		7	Xi TAO	S0068	cp
详情	9	J,NIM/B	Development of laboratory standards for AMS measurement of 237Np	268	11-12	1949	3CPRAEP	201006	Xianggao Wang	Allocated	Compiled	3	Youxiang ZHUANG	32683	n
详情	10	J,NIM/B	Measurements of the 89Y(n,γ)90mY cross-section in the neutron energy range of 13.5-14.6 MeV	268	9	1367	3CPRLNZ	201005	Fengqun Zhou	Allocated	Compiled	4	Youxiang ZHUANG	32678	n

The EXFOR compilation management system in CNDC

Thank you for your attention !
Comments and suggestion welcome !

.	Ref.	Title	Vol.	Lab	Publish Date	Author	Action	Delay date(m)	Compiler	Entry	Sub.
1	J,EPJ/A	Cross-section measurement for the 67Zn(n,a)64Ni reaction at 6.0 MeV	A43	3CPRBJG	201001	Guohui Zhang	Compiled		Zhendong WU	32672	n
2	J,PR/C	Investigation of discrete gamma radiation in interactions of 14.9-MeV neutrons with natural silicon by a total gamma-radiation measurement technique	82	3CPRBNU	201010	Hongyu Zhou		7	Xi TAO	32688	n
3	J,HFH	95Zr,140Ba, and 147Nd Yields from 0.57, 1.0, and 1.5 MeV Neutrons Induced Fission of 235U	32	3CPRAEP	201012	Feng Jing	Compiled	3	Guochang CHEN	32687	n
4	J,CST	Measurement of 176Hf(n,2n)175Hf Cross Section	44	3CPRNPC	201009	Zhu Chuanxin		8	Youxiang ZHUANG	32686	n
5	J,CPL	Fragmentation Cross Sections of 12C on Different Targets at Beam Energies from 50 to 100MeV/Nucleon	25	3CPRBNU	200802	BIAN Bao-An (卞宝安)		39			cp
6	J,CPL	Measurement of Angular Distribution for the 8Li(p,d)7Li Reaction	25	3CPRAEP	200802	LI Yun-Ju		39	Jimin WANG	S0072	cp
7	J,IPC	Cross-section measurements for 141Pr isotope at neutron energies from 13.5 to 14.8 MeV	79	3CPRHXU	201009	Junhua Luo	Compiled		Jimin WANG	32685	n
8	J,PR/C	Differential cross section for neutron scattering from 209Bi at 37 MeV	82	3CPRAEP	201008	Zuying Zhou	Compiled	7	Guochang CHEN	32684	n
9	J,NIM/B	Measurements of the elastic scattering cross sections for proton on T,4He	268	3CPRFUD	201008	T.Cai	Finalized		Guochang CHEN	S0071	cp
10	S,JAEA-C-	Preliminary Measurement of Neutron Emission Spectra for Beryllium at 21.65 MeV	JAEA-Conf-2009-004	3CPRAEP	200910	Changlin LAN	Compiled	10	Guochang CHEN	32682	n
11	S,ISINN-	Cross section measurements for the 143Nd(n,α)140Ce reaction at 4.0, 5.0 and 6.0 MeV	17	3CPRBJG	201007	Yu.M.Gledenov	Finalized	1	Guochang CHEN	32681	n
12	J,RCA	Cross section measurements of (n, 2n), (n, p) and (n, α) reactions on gadolinium isotopes in the neutron energy range of 13.5 to 14.8 MeV	98	3CPRNPC	201003	Junhua Luo	Finalized	6	Guochang CHEN	32680	n
13	J,PR/C	Cross-section measurement and analysis for the 149 Sm(n,α) 146 Nd reaction at 6.0 MeV	82	3CPRBJG	201007	Yu.M.Gledenov	Finalized	1	Jimin WANG	32679	n
14	J,CPL	Astrophysical Reaction Rates of the 8Li(p,\gamma)9Beg.s. Direct Capture Reaction	23	3CPRAEP	200601	SU Jun		64	Xi TAO	S0070	cp
15	J,NP/A	Competition between fusion-fission and quasi fission processes in 32S+184W reaction	834	3CPRAEP	201003	C.L.Zhang	Compiled	6	Xi TAO	S0069	cp
16	J,NP/A	Elastic resonance scattering of 13N+p and 17F+p	834	3CPRAEP	201003	Y.B.Wang		14	Xi TAO	D0477	cp
17	J,NIM/B	Development of laboratory standards for AMS measurement of 237Np	268	3CPRAEP	201006	Xianggao Wang	Finalized	3	Youxiang ZHUANG	32683	n
18	J,NIM/B	Measurements of the 89Y(n,γ)90mY cross-section in the neutron energy range of 13.5–14.6 MeV	268	3CPRLNZ	201005	Fengqun Zhou	Finalized	4	Youxiang ZHUANG	32678	n
19	J,NIM/A	Accurate determination of cross-sections for 238U (n, 2n) 237U induced by neutrons around 14 MeV	621	3CPRAEP	201009	Xianggao Wang	Finalized	3	Youxiang ZHUANG	32677	n
20	J,JRN	Measurement of neutron-induced activation cross sections of lanthanum at 14.8 MeV	283	3CPRHXU	201002	Junhua Luo	Finalized	6	Jimin WANG	32675	n