Nuclear Reaction Compilation and Web Dissemination Efforts in the Area #1

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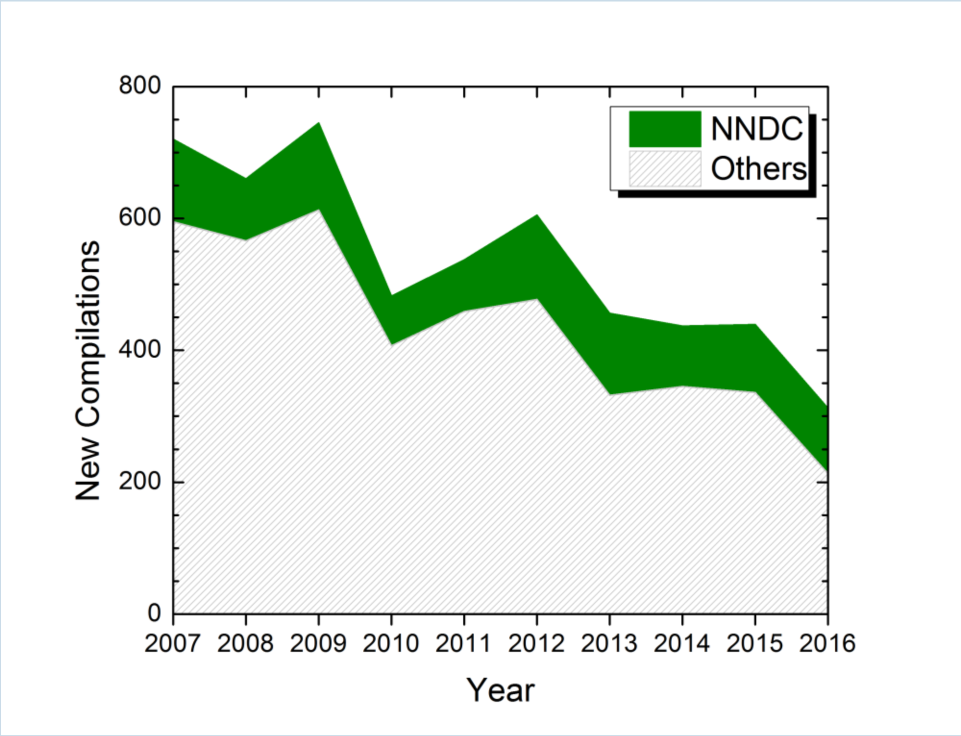
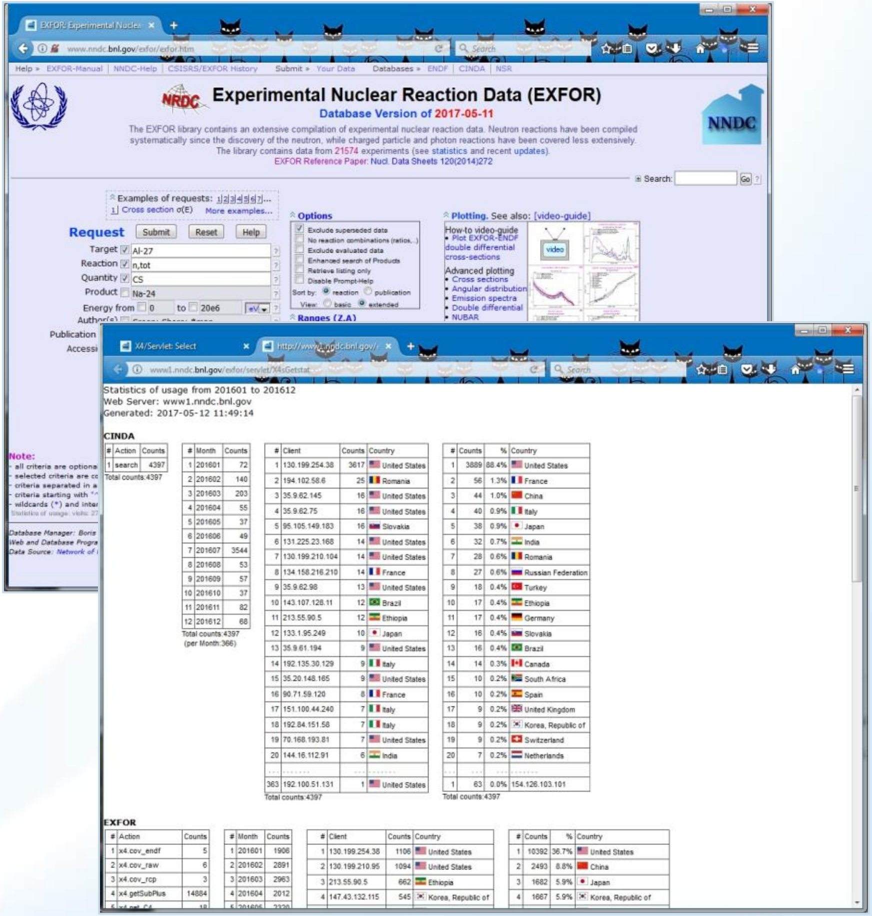
State of Compilations

- NNDC EXFOR team: B. Pritychenko, S. Hlavac, O. Schwerer.
- 97 new compilations and more in the final trans 1424.
- 245 revised compilations.
- 203,603 data points and more in prelims.
- https://www-nds.iaea.org/exfor-master/x4compil/exfor_input.htm
- *NNDC compilation productivity remained steady over the last 10 years.*
- We have kept our productivity in spite of changing requirements geared towards constantly increasing quality.



NNDC EXFOR Web Interface

- NNDC moved to the IAEA style Web Interface.
- Strong cooperation with V. Zerkin (IAEA) on EXFOR Web dissemination who is responsible for Web developments.
- We are running on a 24seven basis.
- Cybersecurity is a very big issue for all Web applications.
- Database updates are available on the same day as Viktor releases them.
- We have adopted Viktor’s style of a ``conservative” retrieval counting.
- 2016 EXFOR retrievals for two servers: 28,337 + 31,919 = 60,256.



EXFOR Operational Issues

- For some reasons NRDC and NSDD meetings were scheduled at the same time. Consequently, physicists who involved in both projects lost the opportunity to attend both meetings this issue should be resolved.
- Only 10 EXFOR updates since the last NRDC meeting, still long gaps: July-September and December-February.
- EXFOR rules and regulations
  - C0500 (ORNL data): area #... is jumping on NNDC data, compiles them without informing us and finally asks about an accession number.
  - Similar issue with $^{239}Pu(n,n')$ LLNL data: area #... compiled data without even talking to NNDC. I had contacted the authors and asked them to pass data to NNDC in the future.
  - I think that all of us should follow the EXFOR/NRDC rules and regulations. We should respect geographic areas and avoid overlaps, otherwise these issues would lead us to CHAOS.

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TITLE      A kinematically complete, interdicsiplinary, and        C900100100003
            coinstitutional measurement of the 19F(a,n) cross      C900100100004
            section for nuclear safeguards science                 C900100100005
AUTHOR     (W.A.Peters, M.S.Smith, S.Pittman, S.J.Thompson,        C900100100006
            R.R.C.Clement, J.A.Cizewski, S.D.Pain, M.Febbraro,     C900100100007
            K.A.Chipps, S.Burcher, B.Manning, C.Reingold,          C900100100008
            R.Avetisyan, A.Battaglia, Y.Chen, A.Long, S.Lyons,     C900100100009
            S.T.Marley, C.Seymour, K.T.Siegl, M.K.Smith,           C900100100010
            S.Strauss, R.Talwar, D.W.Bardayan, A.Gyurjinyan,       C900100100011
            K.Smith, C.Thornsberry, P.Thompson, M.Madurga,         C900100100012
            E.Stech, W.-P.Tan, M.Wiescher, S.Ilyushkin, Z.Tully,   C900100100013
            M.M.Grinder)                                           C900100100014
INSTITUTE  (1USAORL,1USAINL,1USARUT,1USANOT,1USAMHG,1USATEN,       C900100100015
            1USACSM,1USATTU)                                       C900100100016
           (1USAUSA) U.S. Air Force                                C900100100017
REFERENCE  (R,INL/EXT-16-38791,2016)                               C900100100018
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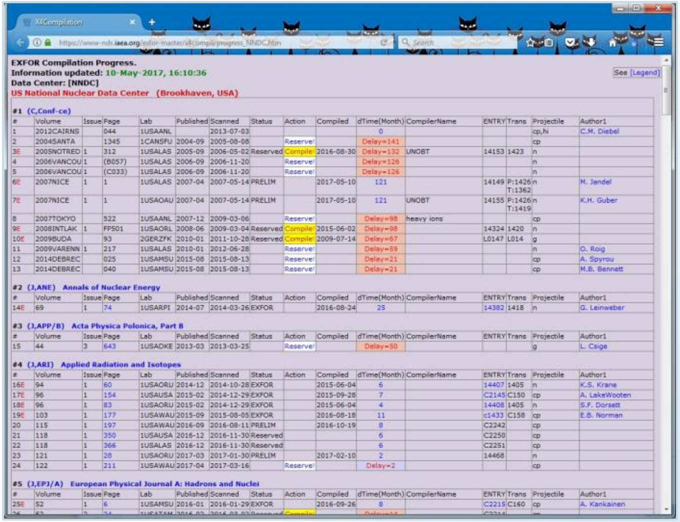
Re-Analysis of the NNDC EXFOR Compilation Progress

- https://www-nds.iaea.org/exfor-master/x4compil/progress_NNDC.htm
- Useful page; it is not as bad as it looks.
- 20 entries prior to 2008 were re-analyzed and compiled
  - 2 papers were wrongly assigned to the area #1
  - 5 reviews, just the existing entries reference update
  - 5 particle physics (pi, eta mesons, ...)
  - Exotic ^{271}Ds production cross section based on a single event
  - 2 Level densities parameters (LDP) papers from Ohio University, thanks to A. Voinov I was able to compile the cross sections that were not publicly available
  - Plenty of digitization cases for yields with heavy ions
  - This case study provides a glimpse into missing data in the recent years and EXFOR compilers selection process
- This list should be periodically revisited and cleaned by the compilers and list managers.



EXFOR Compilation Progress.
Information updated: 10-May-2017, 16:10:36
Data Center: [NNDC]
US National Nuclear Data Center (Brookhaven, USA)

See [Legend]

#1 (C,Conf-ce)

#	Volume	Issue	Page	Lab	Published	Scanned	Status	Action	Compiled	dTime(Month)	CompilerName	ENTRY	Trans	Projectile	Author1
1	2012CAIRNS		044	1USAANL		2013-07-03				0				cp,hi	C.M. Diebel
2	2004SANTA		1345	1CANSFU	2004-09	2005-08-08		Reserve!		Delay=141				cp	
3E	2005NOTRED	1	312	1USALAS	2005-09	2006-05-02	Reserved	Compile!	2016-08-30	Delay=132	UNOBT	14153	1423	n	
4	2006VANCOU	1	(B057)	1USALAS	2006-09	2006-11-20		Reserve!		Delay=126				n	
5	2006VANCOU	1	(C033)	1USALAS	2006-09	2006-11-20		Reserve!		Delay=126				n	
6E	2007NICE	1	1	1USALAS	2007-04	2007-05-14	PRELIM		2017-05-10	121		14149	P:1426 T:1362	n	M. Jandel
7E	2007NICE	1	1	1USAOAU	2007-04	2007-05-14	PRELIM		2017-05-10	121	UNOBT	14155	P:1426 T:1419	n	K.H. Guber
8	2007TOKYO		522	1USAANL	2007-12	2009-03-06		Reserve!		Delay=98	heavy ions			cp	
9E	2008INTLAK	1	FP501	1USAORL	2008-06	2009-03-04	Reserved	Compile!	2015-06-02	Delay=98		14324	1420	n	
10E	2009BUDA		93	2GERZFK	2010-01	2011-10-28	Reserved	Compile!	2009-07-14	Delay=67		L0147	L014	g	
11	2009VARENN	1	217	1USALAS	2010-01	2012-06-28		Reserve!		Delay=59				n	O. Roig
12	2014DEBREC		025	1USAMSU	2015-08	2015-08-13		Reserve!		Delay=21				cp	A. Spyrou
13	2014DEBREC		040	1USAMSU	2015-08	2015-08-13		Reserve!		Delay=21				cp	M.B. Bennett

#2 (J,ANE) Annals of Nuclear Energy

#	Volume	Issue	Page	Lab	Published	Scanned	Status	Action	Compiled	dTime(Month)	CompilerName	ENTRY	Trans	Projectile	Author1
14E	69	1	74	1USARPI	2014-07	2014-03-26	EXFOR		2016-08-24	25		14382	1418	n	G. Leinweber

#3 (J,APP/B) Acta Physica Polonica, Part B

#	Volume	Issue	Page	Lab	Published	Scanned	Status	Action	Compiled	dTime(Month)	CompilerName	ENTRY	Trans	Projectile	Author1
15	44	3	643	1USADKE	2013-03	2013-03-25		Reserve!		Delay=50				g	L. Csige

#4 (J,ARI) Applied Radiation and Isotopes

#	Volume	Issue	Page	Lab	Published	Scanned	Status	Action	Compiled	dTime(Month)	CompilerName	ENTRY	Trans	Projectile	Author1
16E	94	1	60	1USAORU	2014-12	2014-10-28	EXFOR		2015-06-04	6		14407	1405	n	K.S. Krane
17E	96	1	154	1USAUSA	2015-02	2014-12-29	EXFOR		2015-09-28	7		C2145	C150	cp	A. LakeWooten
18E	96	1	83	1USAORU	2015-02	2014-12-29	EXFOR		2015-06-04	4		14408	1405	n	S.F. Dorsett
19E	103	1	177	1USAWAU	2015-09	2015-08-05	EXFOR		2016-08-18	11		c1433	C158	cp	E.B. Norman
20	115	1	197	1USAWAU	2016-09	2016-08-11	PRELIM		2016-10-19	8		C2242		cp	
21	118	1	350	1USAUSA	2016-12	2016-11-30	Reserved			6		C2250		cp	
22	118	1	366	1USALAS	2016-12	2016-11-30	Reserved			6		C2251		cp	
23	121	1	28	1USAORU	2017-03	2017-01-30	PRELIM		2017-02-10	2		14468		n	
24	122	1	211	1USAWAU	2017-04	2017-03-16		Reserve!		Delay=2				cp	

#5 (J,EPJ/A) European Physical Journal A: Hadrons and Nuclei

#	Volume	Issue	Page	Lab	Published	Scanned	Status	Action	Compiled	dTime(Month)	CompilerName	ENTRY	Trans	Projectile	Author1
25E	52	1	6	1USAMSU	2016-01	2016-01-29	EXFOR		2016-09-26	8		C2215	C160	cp	A. Kankainen

Re-Analysis of the NNDC EXFOR Compilation Progress

- Relevant findings stipulated by the list and Nuclear Science References database analyses: it useful to consider multiple data sources.
- SuperHeavy are often missing in EXFOR
  - Areas #1,2,4 - plenty of missing publications
  - Area #3 (Japan) is clean, RIKEN results are compiled
  - Large number of publications have been identified and passed to the relevant centers
- R.J. Hoff measurement of $^{255}Fm(n,\gamma)$ cross sections at Livermore
  - Potential for recovery of Missing Data at Livermore Lab.
- Finally, proactive additions to the EXFOR list, when all possible marginal papers (high-energy, LDP reviews) are included, demonstrates the same situation as with the UNOBT data at NNDC in the past: poor selectivity and luck priorities.
- We have to prioritize better because our resources are limited!!!

Good news for EXFOR Compilers

- New data preservation requirements in Nature Physics (DOI: 10.1038/NPHYS3916) and Nature (doi:10.1038/nature21717) journals.
- The rest of physics journals will eventually follow.
- Steady, strong growth is expected for open-access journals by D. Kramer, http://dx.doi.org/10.1063/PT.3.3550.

Conclusions & Outlook

- EXFOR compilation and Web dissemination efforts in Area #1 are going strong.
- We proactively compile new and previously missed references, improve the existing compilations.
- EXFOR Web Interface is running on a 24seven basis and provides a reliable dissemination and reaction-user interaction platform.
- EXFOR database updates are almost instantly (in a few hours) available at NNDC since the public release.
- More work on recovery of missing data and proactive interactions with USNDP and CSEWG is planned.
- Active interactions with basic science user communities: DNP APS, FRIB, Nuclear Astrophysics... are in progress.