MSU SINP CDFE 2003 – 2004 Progress Report.

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Progress Report
to the IAEA Technical Meeting on the Network of Nuclear Reaction Data Centres (04 - 07 October 2004, NNDC, BNL, Brookhaven, USA)

This report contains the **short review** of the works carried out by the CDFE concern the IAEA Nuclear Reaction Data Centres Network activities for the period of time from the IAEA Technical Meeting on "Coordination of the Network of Nuclear Reaction Data Centres" (17 - 19 June 2003, IAEA NDS, Vienna, Austria) till the fall of 2004 and main results obtained.

1. **Two new** CDFE EXFOR **TRANSes M034 and M035** have been produced and transmitted to the IAEA NDS. The TRANSes contain (**Annex 1**) 6 retransmitted and 13 new (M0645 - M0657) ENTRYs with 148 new data SUBENTs.

2. In cooperation with CAJaD (Dr. Feliks E.Chukreev) the CDFE relational nuclear data databases "Relational ENSDF" and "Nuclear Reaction Database (EXFOR)" and with very kind assistance of NNDC (Dr. David Winchell) the CDFE database "Nuclear Physics Publications ("NSR" Database) have been put upon the Web-site (**http://cdfe.sinp.msu.ru**) before were **upgraded** by adding a new data and software improvement.

3. At first time **nuclei levels isospin data** produced "by hands" using text parts (CONTINUATION etc.) of ENSDF data sets were included into the CDFE "**Relational ENSDF**" database. Now isospin values could be included into all possible queries.

4. The new advanced version of complete relational database "**Relational ENSDF**" **Search Engin**e has been developed (**Annex 2**). This is very flexible and powerful system – informational "Russian matreshka": the user can open sequentially each needed part yourself, in parallel he can form the output table content. Now any fields of any ENSDF cards could be found in any combinations (several examples of Search Engine possibilities: **Annex 3 - Annex 11**).

5. All three complete CDFE databases EXFOR, ENSDF and NSR are combined now into unified information system:
    - after processing of any queries to "**Relational ENSDF**" and "**Nuclear Reaction Database (EXFOR)**" one can obtain correspondent complete NSR documents;
    - after processing of any query to "NSR" one can obtain an access to appropriate documents of both databases "EXFOR" and "ENSDF":

- for EXFOR (**Annex 12**) the intermediate table "NSR => EXFOR"gives to one a list of full article Subentries and opportunity to obtain NSR documents for that article (come back to NSR);
- for ENSDF (**Annex 13**) the intermediate table gives to one general description of article content including "Nucleus", "Experimental information", "ENSDF Source" set CDFE internal numbers and "References" to other NSR document codes concern the article content; these codes are links to correspondent NSR documents and therefore search process could be cycled.

6. As an continuation of consistent evaluation of total and partial photonuclear reactions cross sections obtained in the experiments with quasimonoenergetic annihilation photon beams at USA Livermore and France Saclay for 19 nuclei ^{51}V, ^{75}As, ^{89}Y, ^{90}Zr, ^{115}In, ^{116,117,118,120,124}Sn, ^{127}I, ^{133}Cs, ^{159}Tb, ^{165}Ho, ^{181}Ta, ^{197}Au, ^{208}Pb, ^{232}Th, ^{238}U (V.V.Varlamov, N.N.Peskov, D.S.Rudenko, M.E.Stepanov. Consistent Evaluation of Photoneutron Reaction Cross Sections Using Data Obtained in the Experiments with Quasimonoenergetic Annihilation Photon Beams at USA Livermore and France Saclay. Voprosy Atomnoj Nauki i Tekhniki. Seriya: Yadernte Konstanty, 1 – 2 (2003) 48 – 89) joint evaluation of cross sections for reactions (γ,n), $(\gamma,2n)$, $(\gamma,3n)$, (γ,Xn), (γ,sn) and (γ,abs) has been carried out. Data are in preparation n to including into EXFOR.

7. The CDFE "Atlas of Giant Dipole Resonances. Parameters and Graphs of Photonuclear Reaction Cross Sections" published by A.V.Varlamov, V.V.Varlamov, D.S.Rudenko, M.E.Stepanov at 1999 as INDC(NDS)-394, IAEA NDS was put upon the CDFE Web-site as the pdf-document.

The main items of CDFE future short-term programmes, priorities and new tasks are listed in the **Annex 14**.

Annex 1. The CDFE new EXFOR TRANSes M034 and M035 contents (*old corrected* and new ENTRYs)

TRANS M034		TRANS M035	
ENTRY's Number	**SUBENT Amount**	**ENTRY's Number**	**SUBENT Amount**
L0031	*15*	*M0524*	*5*
M0093	*3*	*M0541*	*11*
M0644	*5*	*M0542*	*14*
M0645	10	M0651	12
M0646	1	M0652	6
M0647	3	M0653	4
M0648	31	M0654	2
M0649	15	M0655	5
M0650	9	M0656	38
		M0657	12
Total new: 6	**Total new: 59**	**Total new: 7**	**Total new: 79**
		Sum new: 13	**Sum new: 131**

Annex 2. The new database "Relational ENSDF" search form ("Russian matreshka").

…etc.

Annex 3.   The new database "Relational ENSDF" query for:
A = 50 - 150,
level energies 10 - 12 MeV,
γ-quanta energies 1000 - 1030 keV.

Annex 4. The new database "Relational ENSDF" query for:

levels with $J^\pi = 69/2^+$

and energies 9 - 10 MeV

(energies of gammas

and final level energies

and J^π are requested also).

Annex 5. The new database "Relational ENSDF" query for:
levels with $J^\pi = 7/2^-$,
isospin $T = 3/2$,
energies $E = 1 - 13$ MeV and
photon energies $E\gamma = 2 - 5$ MeV
(final level energy and J^π are requested).

ENSDF Source	Nucleus	Level energy	Spin-parity	Half-life	Isospin	Photon energy	Level energy (fin.)	Spin-parity (fin.)
39.26	19-K-39	6546 (2)	7/2-	14 FS	3/2	3732	2814.3 (2)	7/2-
41.47	20-CA-	7146	7/2-		3/2	4186	2959.3 (6)	7/2-
51.78	25-MN-51	51 (2)	7/2-		3/2	2141	2310.0 (5)	5/2(-)
51.7	25-MN-51	4451 (2)	7/2-		3/2	194	2255.7 (1)	(5/2-)
51.81	25-MN-51	4451 (2)	(7/2)-		3/2	2141	2310.0 (5)	5/2-
51.	25-MN-51	4451 (2)	(7/2)-			2194	2255.7 (1)	(5/2-)
57.61	28-NI-57	523 (7)	7/2-		3/2	2008.7	3230.1 (7)	7/2-
57.61	28-NI-57	3238.8 (7)	7/2-		3/2	2661.4	2577.4 (5)	7/2-
59.70	29-CU-59	5897 (4)	7/2-		3/2	2782	3114.1 (5)	5/2-
59.70	29-CU-59	5897 (4)	7/2(-)		3/2	2563	3930.0 (24)	5/2+
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	2587	3905.2 (18)	3/2-
59.70	29-CU-59	6 (4)	7/2(-)		3/2	2606	3885.5 (21)	3/2-
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	2794	3699 (4)	7/2-
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	2919	3573.9 (8)	5/2,7/2
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	2942	3550.6 (13)	5/2-
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	3059	3434 (4)	5/2
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	3184	3309.0 (20)	7/2(-)
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	3378	3114.1 (5)	5/2-
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	3451	3042.71 (17)	9/2+
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	3565	2928.2 (16)	5/2(-)
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	3777	2715.01 (13)	7/2(-)
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	3784	2706.04 (22)	5/2(-)
59.70	29-CU-59	6493 (4)	7/2(-)		3/2	3829	2664.50 (17)	(9/2-)
59.74	29-CU-59	5897	7/2-		3/2	2782	3115	5/2-

Annex 6. The new database "Relational ENSDF" query for:

nuclear levels with isospin T ≥ 1

 included into the ENSDF in 2002

(isospin value is available).

**Code "2002"
in the window "Date"
of the field
"Bibliography"
below.**

Annex 7.   The new database "Relational ENSDF" query for:

γ-transitions with changing

of isospin value from 2 to 1

(photon energy and multipolarity values requested).

Annex 8. The new database "Relational ENSDF" query for: nuclei with levels having isospin value T ≥ 10.

Annex 9.   The new database "Relational ENSDF" query for:
levels with energy more
than neutron separation energy
(requested also) in region 4 – 5 MeV.

Annex 10. The new database "Relational ENSDF" query for:
data from all reactions with incident A = 40 nuclides.

Annex 11. The new database "Relational ENSDF" query for:
γ–transitions between the levels
with definite J^{π} values
(in one case - $20^{+} \rightarrow 20^{+}$, in another - $20^{+} \rightarrow 22^{+}$)

The only one level
with $J^{\pi}_{final} = 22^{+}$ for
$20^{+} \rightarrow 22^{+}$ transition.

Annex 12. Way from document 1985RE02 of NSR (query = Author: Endt) to EXFOR document F0558 and back to correspondent document of NSR.

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<HISTORY >A19850513
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<REFRENCE>Nucl.Phys. A435, 333 (1985)
<AUTHORS >J.P.L.Reinecke, F.B.Waanders, P.Oberholzer, P.J.C.Janse Van Rensburg, J.A.Cilliers, J.J.A.Smit, M.A.Meyer,
P.M.Endt
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<KEYWORDS>NUCLEAR REACTIONS {+29}Si(p,|g),E=0.3-2.3 MeV; measured |s(E(p),E(|g)),Q,E(|g),I|g(|q),DSA. {+30}P
levels deduced resonance,|g branching,T{-1/2} ,J,|p. Enriched targets.
<SELECTRS>T:29SI;A. R:(P,G);A. N:30P;A. M:DSIGMA;A. M:Q;A. M:G-SPECTRA;A. M:DOPPLER;A. N:30P;B.
D:RESONANCE;B. D:G-SPECTRA;B. D:T1/2;B. D:LEVEL-PROP;B.
```
link to EXFOR

Done

CDFE search engine. - Mozilla

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Recordings from 1 to 3

Save

Look through selected data

Subent	First Author	Reference (+ NSR)	Target Nucleus	Reaction *means combination	Final Nucleus	Quantity	Field of Measument		
							Unit	Minimum	Maximum
☐ F0558002	J.P.L.REINECKE+	J,NP/A,435,333,1985	14-SI-29	(P,G)		1 ,EN			
☐ F0558002	J.P.L.REINECKE+	J,NP/A,435,333,1985	14-SI-29	(P,G)		2 ,WID/STR			
☐ F0558003	J.P.L.REINECKE+	J,NP/A,435,333,1985	14-SI-29	(P,G)	15-P-30	PAR,DA,,LEG/RS	MEV	324	2241

Save

Look through selected data

Reference decode. - Mozilla

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J,NP/A,435,333,1985

type Journal
code Nuclear Physics, Section A
volume 435
page 333
date 1985

Data from NSR:

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<AUTHORS >J.P.L.Reinecke, F.B.Waanders, P.Oberholzer, P.J.C.Janse Van Rensburg, J.A.Cilliers,
J.J.A.Smit, M.A.Meyer, P.M.Endt
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<KEYWORDS>NUCLEAR REACTIONS {+29}Si(p,|g),E=0.3-2.3 MeV; measured
|s(E(p),E(|g)),Q,E(|g),I|g(|q),DSA. {+30}P levels deduced resonance,|g branching,T{-1/2} ,J,|p. Enriched
targets.
<SELECTRS>T:29SI;A. R:(P,G);A. N:30P;A. M:DSIGMA;A. M:Q;A. M:G-SPECTRA;A. M:DOPPLER;A.
N:30P;B. D:RESONANCE;B. D:G-SPECTRA;B. D:T1/2;B. D:LEVEL-PROP;B.
```

Done

Annex 13. Way from document 1984RU06 of NSR (query = Author: Endt) to ENSDF data sets (CDFE internal numbers 48.47 and 50.25) and back to another document 1989CO01of NSR for founded ^{47}Ti data.
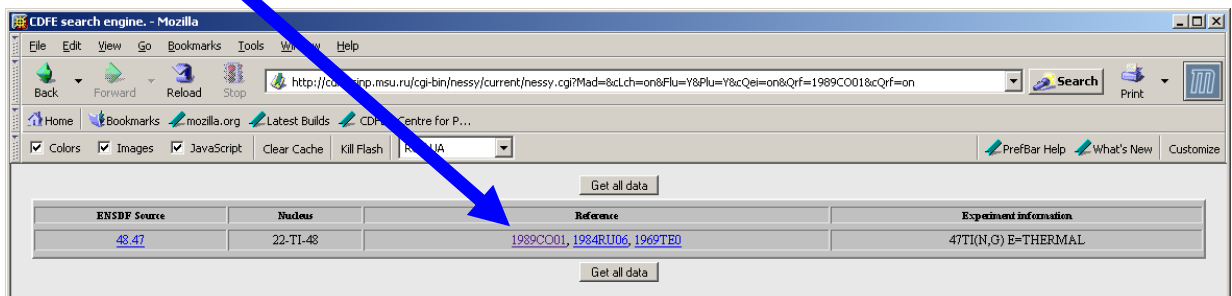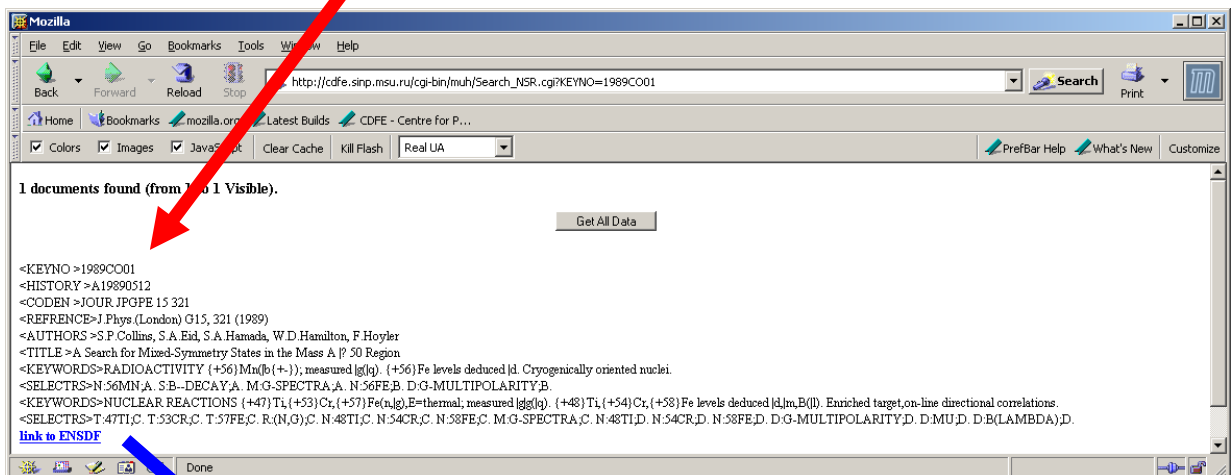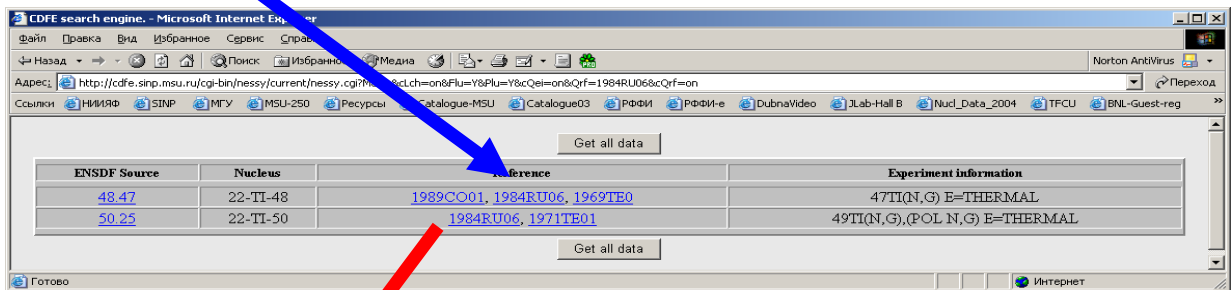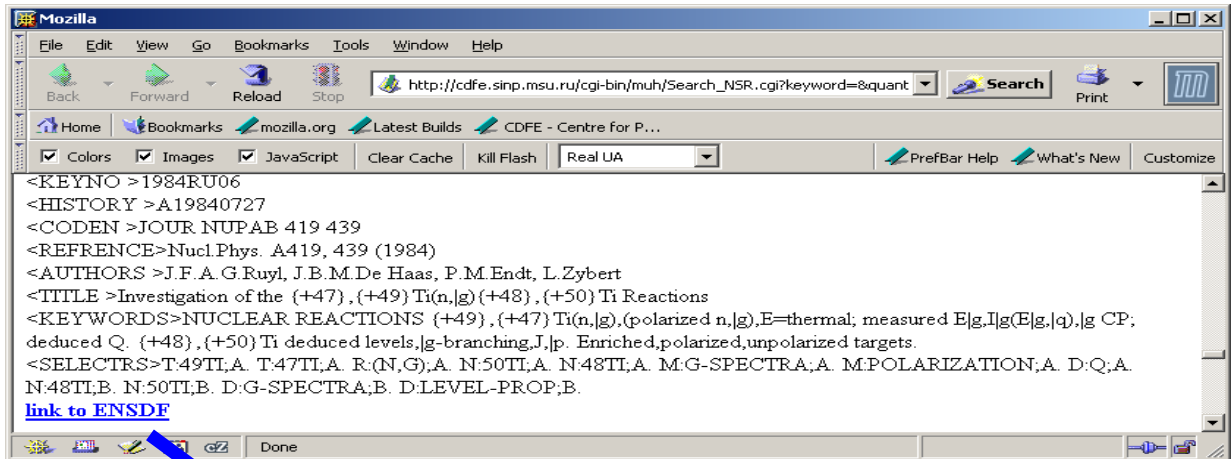
Annex 14. The main items of the CDFE future short-term programmes, priorities and new tasks.

1. Upgrading and addition of the CDFE bibliographical data collection. Including the 2004 photonuclear data into the relational database "Photonuclear Data Index" (PNI).
2. Continuation of photonuclear data compilation using EXFOR format, new TRANSes (M036, M037,…) production.
3. Continuation of joint evaluation of photonuclear reaction cross sections obtained using various methods, first of all in experiments with bremsstrahlung and quasiminoenergetic annihilation photons, with the aim of definition and excluding of systematical discrepancies.
4. Upgrading, addition and correction of the existed CDFE EXFOR relevant databases, improvement of Search Engines:
*   "Giant Dipole Resonance Parameters. Photonuclear Reaction Cross Sections";
*   "Relational Nuclear Reaction Database (EXFOR)";
*   "Relational ENSDF":
    -   Including into the search form additional data (electric and magnetic moments, widths, deformations etc. for levels, reduced probabilities, conversion intensities and coefficients etc. for gamma-rays, etc.) from ENSDF "CONTINUATION" records similar to that has been done before for level isospin values);
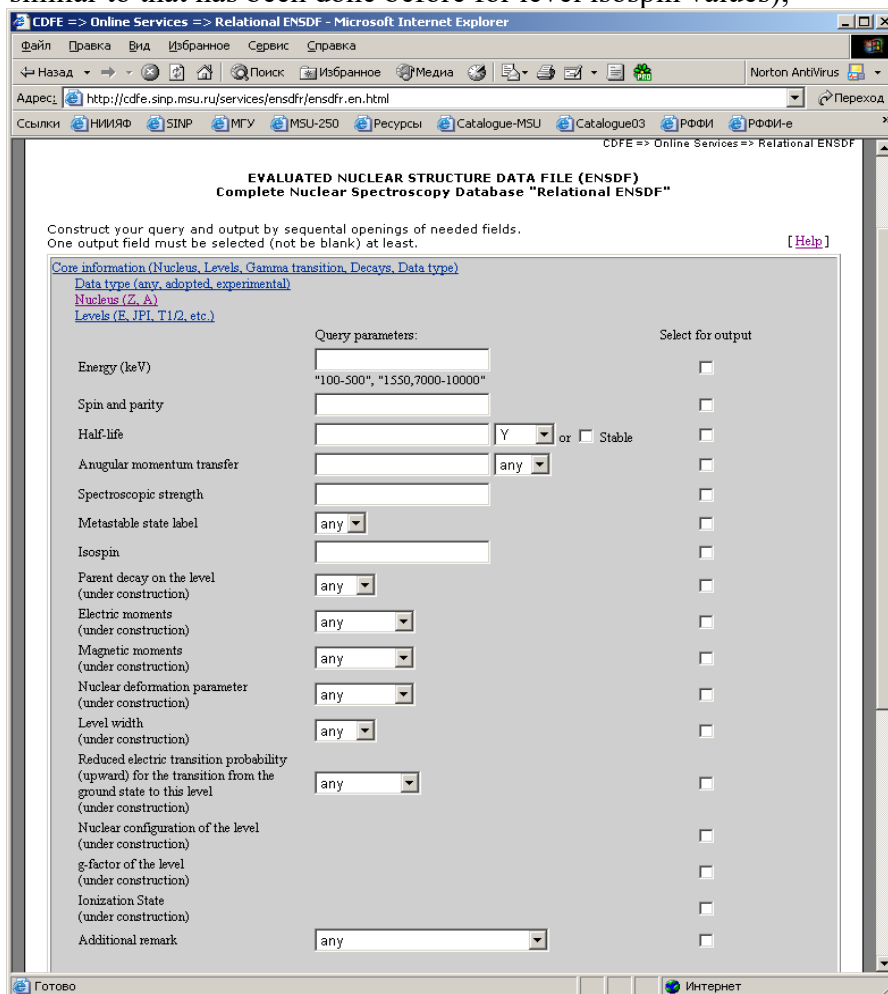
    -   Full ENSDF data set presentation (comments, graphycs) in the output form;
    -   Development of the "quick up-dating" procedures.
5. Development of new unified joint interface for all three complete databases "NSR", "EXFOR" and "Relational ENSDF". It will give to one possibility of working with all three systems at the same time.