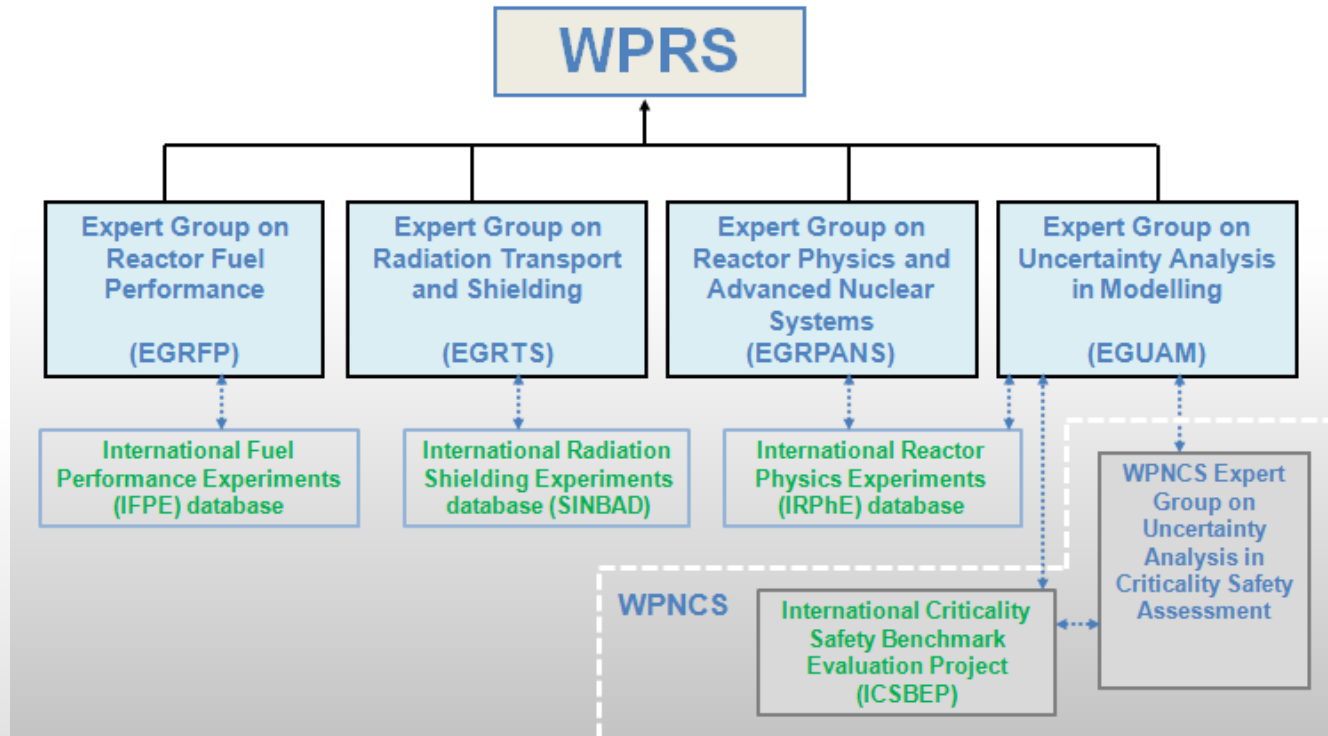


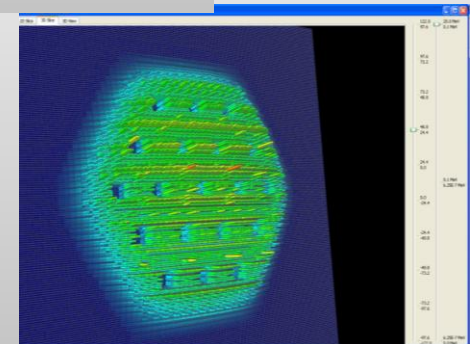
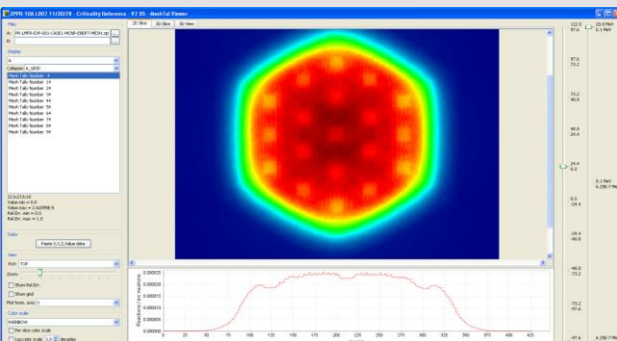
IRPhEP Database and Analysis Tool (IDAT)



<http://www.oecd-nea.org/science/>

Ian Hill

December 2th 2011



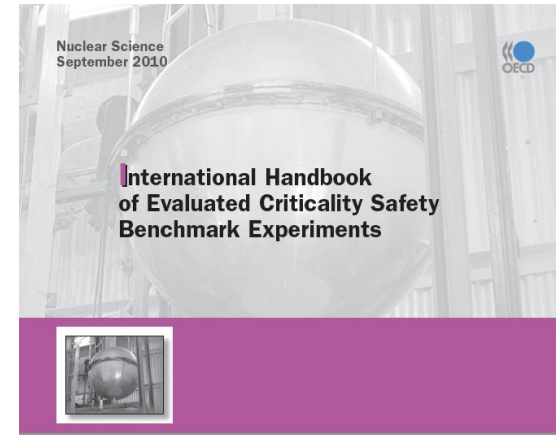
Outline

ICSBEP, IRPhEP (quick reminder) and the Database + Data Analysis Tool

- ICSBEP + DICE (2 Slides)
- IRPhEP overview (1 Slide)

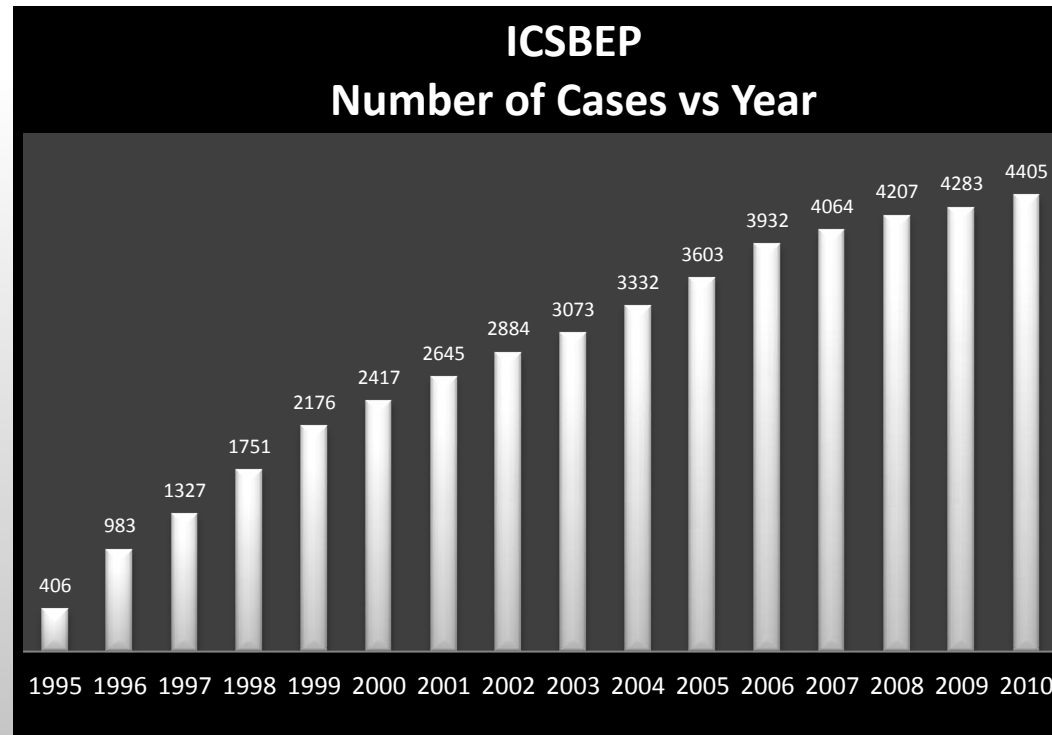
IRPhEP Database and Analysis Tool

- Design (5 Slides)
 - Differences between ICSBEP/DICE requirements*
 - Inclusion of measured + calculated values*
- Features (6 Slides)
 - Demonstration of prototype*
 - Implemented and planned features*
 - Possible relationship with SG33, uncertainty+sensitivities*



Database International Criticality Experiments (est. 2001)

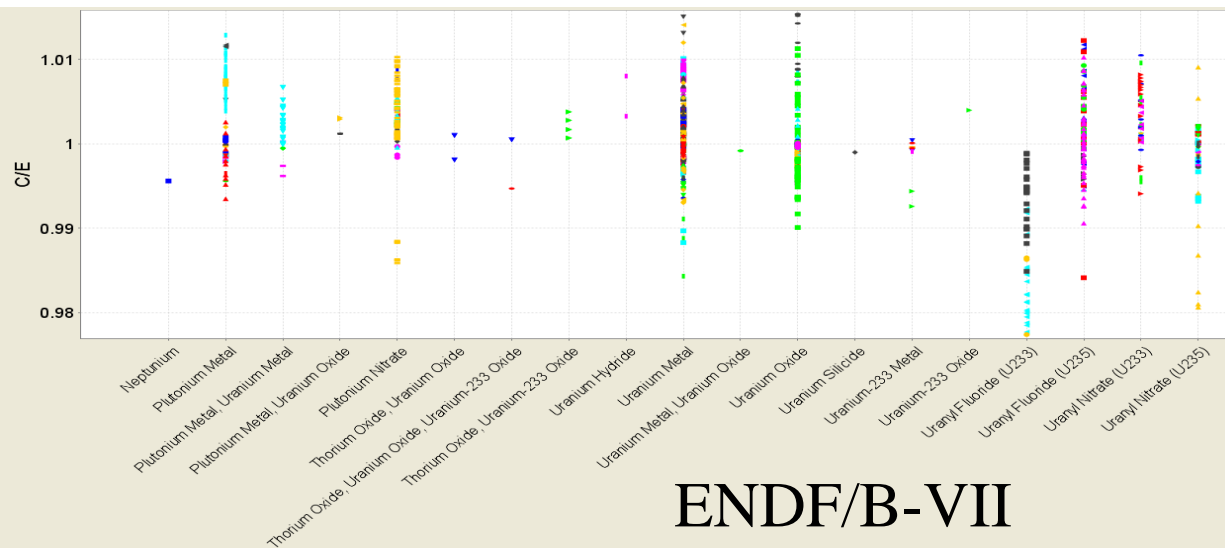
- Efficiently search the ICSBEP handbook. Alternative was opening hundreds of pdfs.
- Search based on keyword, country, spectra, fuel type, materials, etc.
- Allows visual trending of the data.
- Can visually depict the information content of the DVD, identify relevant experiments.
- Contains calculated quantities; 299 group neutron spectra data, neutron balance data, sensitivity data.



~600 Evaluations

DICE: Features

- ✓ Compare spectra
- ✓ Compare capture + fission rate
- ✓ Some correlation data
- ✓ VIBE plugin

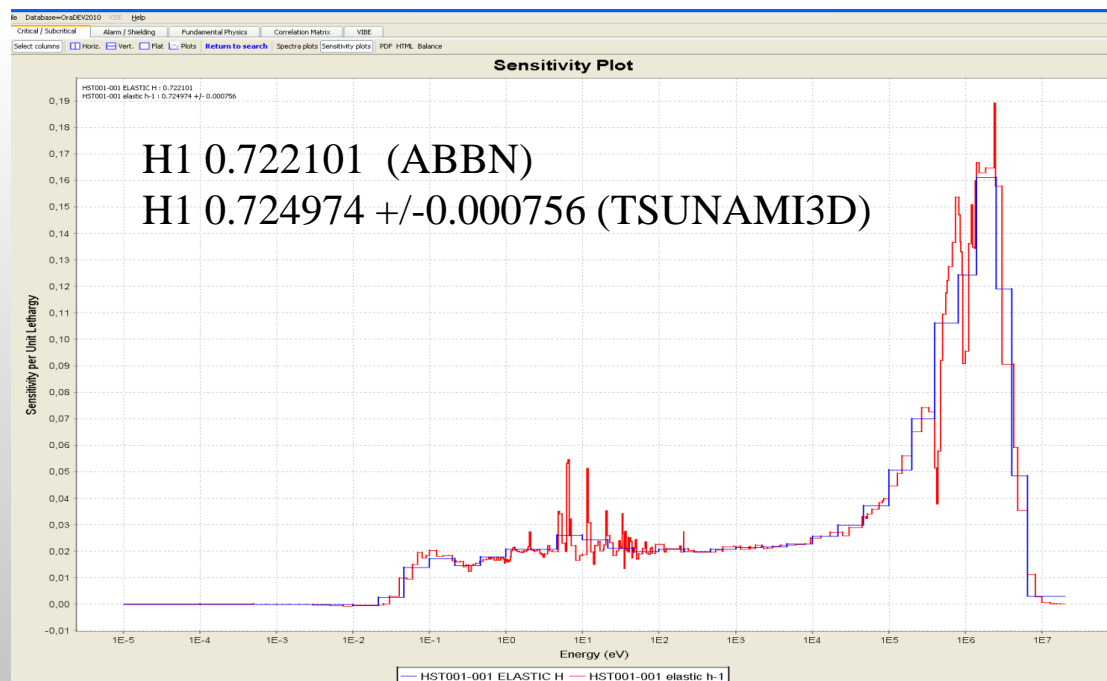


Detailed balance data - LEU-COMP-THERM-001-001

ISOTOP	MASS CAPTURE	FISSION	(n,2n)	PRODUCT
U234	0.036	0.64	0.01	0.03
U235	6.166	72.14	392.45	0.01 954.79
U236	0.045	0.18	0.01	0.02
U238	256.126	149.70	14.75	0.78 41.84
O	1097.857	4.71	0.00	0.00 0.00
AL	32.417	7.59	0.00	0.00 0.00
CU	0.073	0.13	0.00	0.00 0.00
MN	0.022	0.15	0.00	0.00 0.00
ZN	0.036	0.02	0.00	0.00 0.00
SI	0.183	0.03	0.00	0.00 0.00
FE	0.118	0.15	0.00	0.00 0.00
CR	0.055	0.09	0.00	0.00 0.00
H	134.043	352.62	0.00	0.00 0.00
MG	0.289	0.02	0.00	0.00 0.00
TI	0.019	0.07	0.00	0.00 0.00
C	2.834	0.02	0.00	0.00 0.00
TOTAL	588.27	407.23	0.79	996.68

K-EFF = 0.9967890

LEAKAGE = 5.184

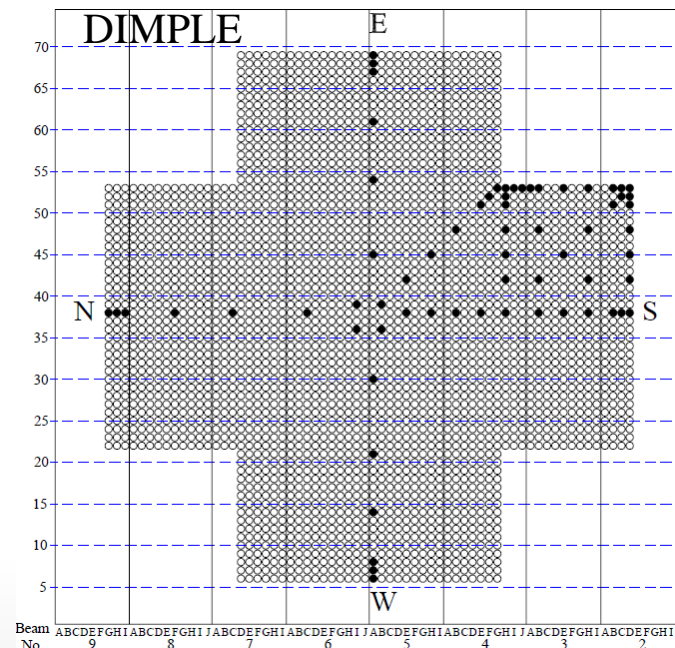


IRPhEP Information Content

- 10+ types of measurements (~40 evaluations in 2010)

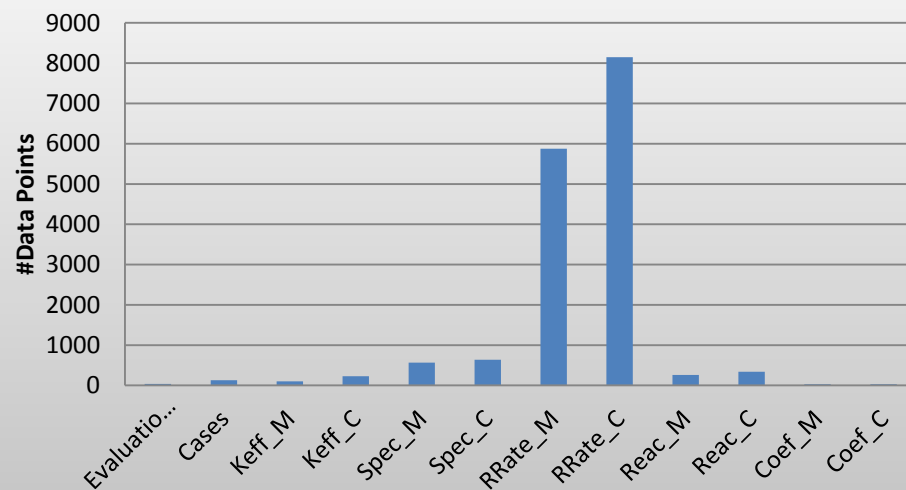
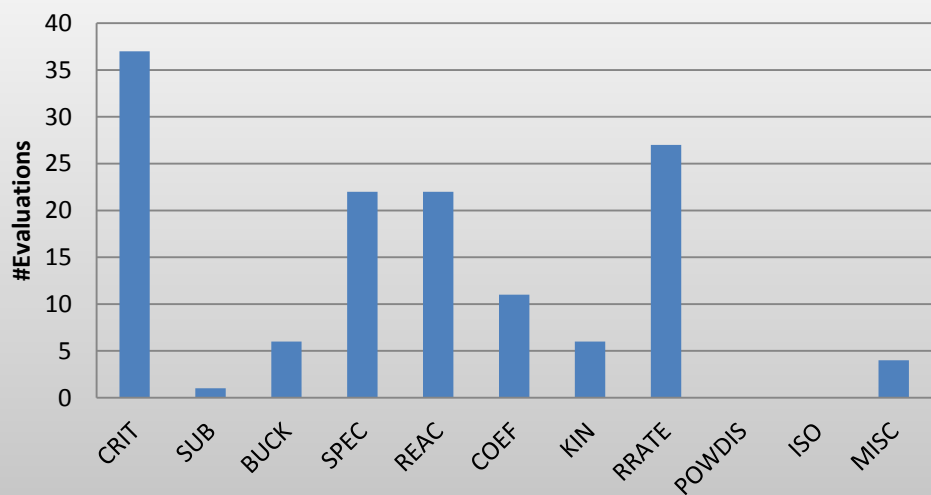
Relevant points when creating a database

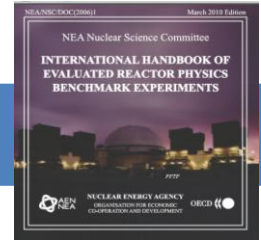
- Lower frequency=difficult to derive standard for measurements with few data points
- **CRIT,SPEC,RRATE** measurements given priority.
- Next most common are REAC,COEF measurements
- Less than 5 evaluations contain SUB,KIN,POWDIS,ISO,MISC measurements (Less need to search, or trend these measurements)
- Each of these measurements includes an evaluation of the experimental uncertainties associated with that measurement



2010 Handbook

2010 Handbook





Why Make a Database?

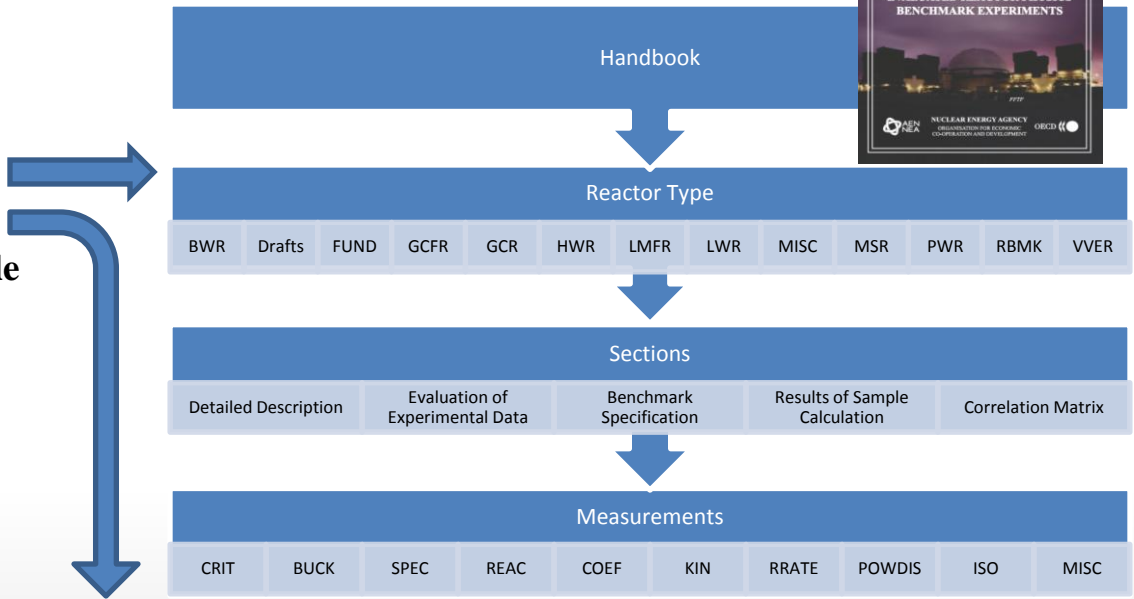
Levels of data preservation

1. Archive
2. Compilation
3. Interpretation + Review → Handbook
4. Database

Extracting, comparing and trending, example C/E k-eff vs. Data Library

Limitations of Handbook

- Difficult to search, opaque information content
- Cannot trend across evaluations
- Adding information requires new revisions

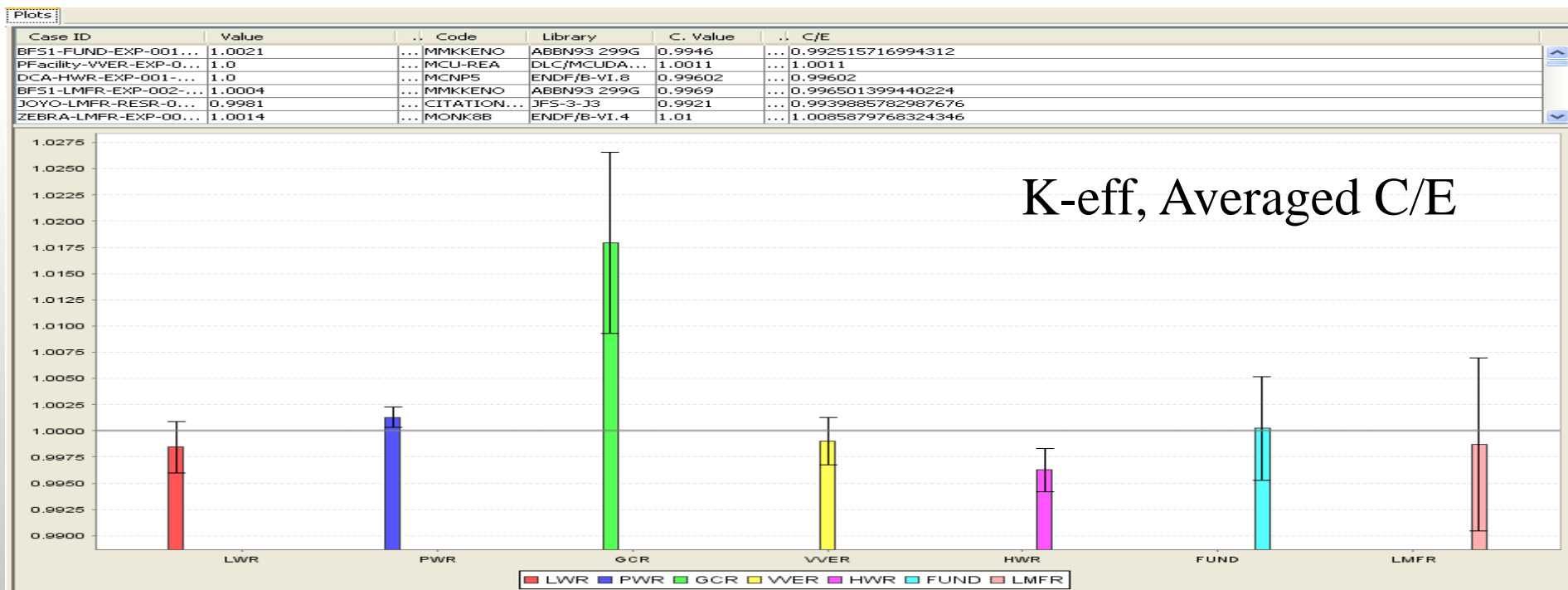


Plots [Return to search](#)

Evaluation identification	Crit	Sub	Buck	Spec	Reac	Coef	Kin	RRate	PowDis	Iso	Misc
ASTRA-GCR-EXP-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ATR-FUND-RESR-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BFS1-LMFR-EXP-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BFS1-LMFR-EXP-002	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BFS1-FUND-EXP-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BFS1-FUND-EXP-002	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BFS1-FUND-EXP-003	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BFS2-LMFR-EXP-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BFS2-FUND-EXP-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CREOLE-PWR-EXP-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CROCUS-LWR-RESR-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DCA-HWR-EXP-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Database Construction: CRIT,SPEC,RRATE done. In progress REAC,COEF.

- Read Evaluations. Enter Key data into EXCEL, observe trends and commonality.
- Prioritize based on information content and user interest.
- Create key parameters list, for each measurement + calculation.
- Standardize format (X,Y,Z coordinates in cm, Measured, Calculated, Percent difference for Error)
- Set up an EXCEL sheet to prepare loading of a RDBMS database.
- Extract data from document, transform into the standard format.



Next Step: Add Calculated Values(what would we like to store)

Calculated data in DICE: (~90 %) Spectra, 3 Group Flux+Reactions, Neutron balance, (~10 %) Nuclear data sensitivity

WISH-LIST (Initially no data available ☹ !)

- *Neutron Balance*
- *Sensitivity to Nuclear Data*
- *Flux and Reaction Spectrums*
- *Spatial Flux and Reactions*
- *Correlation Coefficients*
- *Uncertainty Information*

How to obtain calculated results?

1. Use models in handbook
2. Ask users to contribute
3. In house model adapting and creation

Some Numbers(2010 IRPhEP Handbook)

Some evaluations have models

- 22 MCNP
- 6 KENO (keno+mmk-keno)
- Other-MVP, CITATION etc
- % Evaluations Models Run: ~50 %
(MCNP+Added PRINT cards+MESHTALLY)
- % Cases Models Run: ~30 %

Evaluation identification	Crit																				Output	Balance	Meshtal		
BFS1-LMFR-EXP-002	✓			✓	✓		✓	✓													...	Output	Balance	Meshtal	
BFS1-FUND-EXP-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
BFS1-FUND-EXP-002	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
BFS1-FUND-EXP-003	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
BFS2-FUND-EXP-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
CREOLE-PWR-EXP-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
FFTF-LMFR-RESR-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
HTR10-GCR-RESR-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
HTRR-GCR-RESR-001	✓	✓		✓	✓		✓	✓														...	Output	Balance	Meshtal
HTRR-GCR-RESR-002	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
IPEN(MB01)-LWR-RESR-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
KRITZ-LWR-RESR-001	✓		✓				✓	✓														...	Output	Balance	Meshtal
KRITZ-LWR-RESR-002	✓		✓				✓	✓														...	Output	Balance	Meshtal
RHF-FUND-RESR-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
SNEAK-LMFR-EXP-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
ZPR-LMFR-EXP-001	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal
ZPR-LMFR-EXP-002	✓			✓	✓		✓	✓														...	Output	Balance	Meshtal

Neutron Balance [Close] [Maximize] [Minimize]

3-groups fission

Thermal= 0.0000
Inter= 0.3958
Fast= 0.6042

Neutron balance (normalized to 1000 neutrons)

ZA	Capture	Fission	(n,2n)
28-61	0.10	0.00	0.00
28-62	0.22	0.00	0.00
28-64	0.02	0.00	0.00
29-63	0.26	0.00	0.00
29-65	0.04	0.00	0.00
42-0	5.75	0.00	0.01
92-235	2.43	8.29	0.00
92-238	504.36	58.20	1.95
94-238	0.07	0.10	0.00
94-239	72.11	259.88	0.11
94-240	12.45	9.79	0.01
94-241	1.50	8.42	0.01
94-242	0.30	0.20	0.00
95-241	1.36	0.24	0.00
TOTAL	640.63	345.11	2.12

Avg. neutron per fission= 2.910
Product= 1004.26
Leakage= 16.34
Balance= 1002.07
Keff= 1.0043

New to the IRPhEP Database User Interface Tool

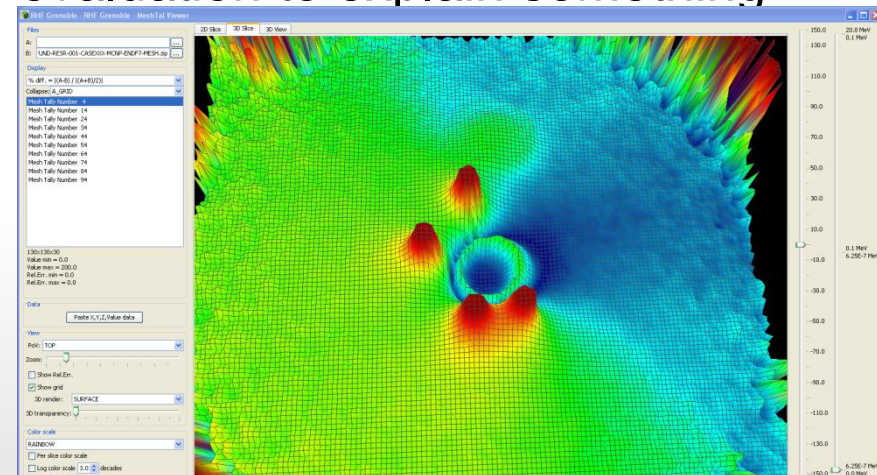
1. MESH Tool
2. Plot features
3. Find Similar Option
4. Balance Computations

Development: MeshViewer Tool (*N.Soppera*)

IRPhEP Experiments are typically more complex

Visualization helps the user understand the reactor and often the experiments. Often will return to the evaluation to explain something they see. Knowledge Management!

- a) Flux
- b) Capture Rates
- c) Fission Rates
- d) Scattering Rates
- e) Neutron Spectra



Can also perform math operations. Useful when constructing a benchmark model in a different core, or observing the impact of removing control rods.

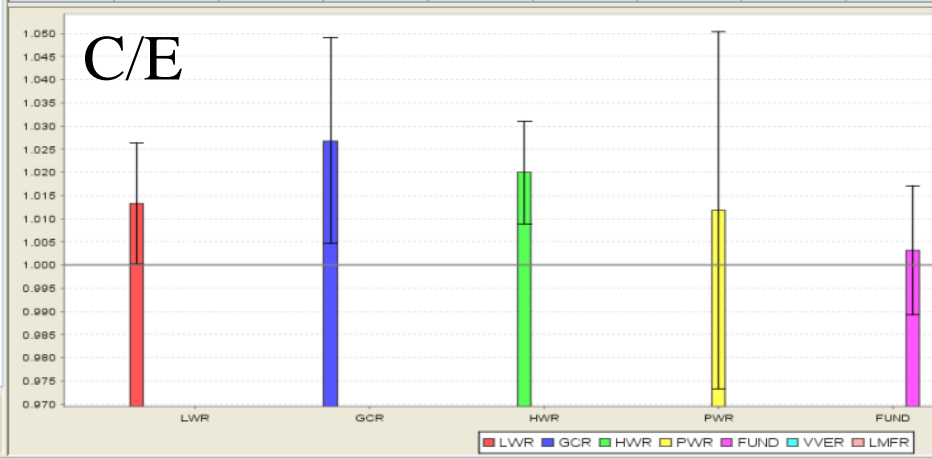
Works with MCNP, SERPENT, KENO (accepting other mesh formats!)

Considering overlaying plot on geometry....perhaps too much?

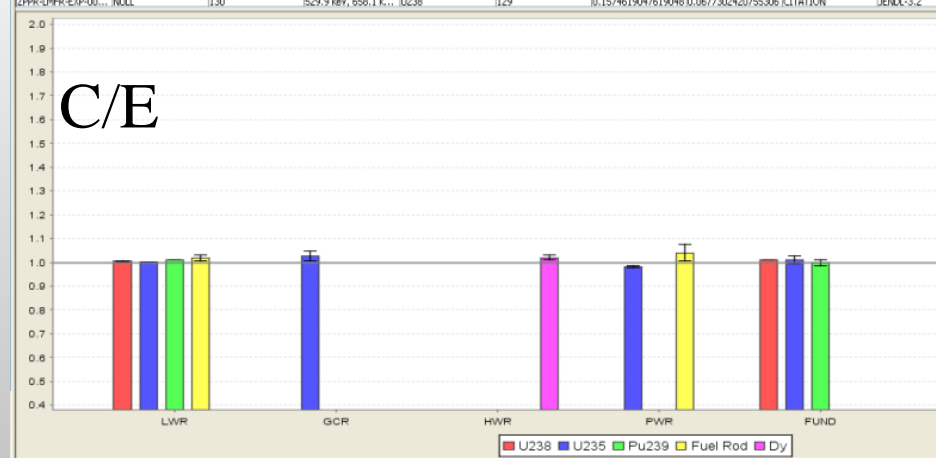
New Plotting Features

- Can collapse data over many measurements.
- Convey big picture, allow user to subsequently drill down to more detail.
- Particularly useful for reaction rate measurements. Additional work needed on collapsing methods (weighted average, correlations).

Case ID	Measurement ID	Device	Device Spec	Device Input	Reaction	Value	Uncertainty	Code
BFS1-LMFR-EXP-00...	NULL	132	NULL	U238	129	0.6111185185185185	0.3581405642078799	IRIXEX
SNEAK-LMFR-EXP-0...	NULL	131	NULL	U238	129	0.6671428571428571	0.3250222389042216	TRANSV/THREEDAN
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	0.14744827586206...	0.0593183033954698	CITATION
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	1.4707142857142859	0.617923745378053	CITATION
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	0.1574619047619048	0.0677302420755306	CITATION
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	0.1481390243902439	0.06360273378864...	CITATION
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	0.173086	0.07034342331732...	CITATION
BFS1-LMFR-EXP-00...	BFS-61-0	131	NULL	U238	129	0.5099792682926831	0.37329594949806...	MMXKXNO
SNEAK-LMFR-EXP-0...	NULL	131	NULL	U238	129	0.7166666666666666	0.2756176325365984	TRANSV/THREEDAN
DIMPLE-LWR-EXP-0...	NULL	135	106 keV	U238	133	0.7549999999999999	0.22048464404776...	WIMBSA
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	0.9522363636363638	0.4151065564680504	CITATION
BFS1-FUND-EXP-00...	NULL	136	278 keV	U238	133	1.0618	0.07875379355942...	MCNPS
DIMPLE-LWR-EXP-0...	NULL	135	1.28MeV>	U238	129	0.758217391304348	0.2127427424852637	WIMBSA
ZPPR-LMFR-EXP-00...	NULL	130	277.6 keV	U238	133	1.0578224489795918	0.37629612105432...	CITATION
ZPPR-LMFR-EXP-00...	NULL	130	277.6 keV	U238	133	0.8900666666666666	0.31811800046872...	CITATION
ZPPR-LMFR-EXP-00...	NULL	130	277.6 keV	U238	133	5.8779818181818175	2.374291032866184	CITATION
ZPPR-LMFR-EXP-00...	NULL	130	277.6 keV	U238	133	8.481446808510636	3.131685453407727	CITATION
ZPPR-LMFR-EXP-00...	NULL	130	277.6 keV	U238	133	0.9003809523809524	0.37975831614963...	CITATION
BFS1-LMFR-EXP-00...	BFS-61-2	131	NULL	U238	129	0.5361956521739131	0.3874429368874815	MMXKXNO



Case ID	Measurement ID	Device	Device Spec	Device Input	Reaction	Value	Uncertainty	Code	Library
SNEAK-LMFR-EXP-0...	NULL	130	277 keV, 185 keV	U238	133	0.7036363636363636	0.2655619334465461	TRANSV/THREEDANT	ENDFB-VI.8
DCA-HWR-EXP-001...	A1-14	137	Beta Decay Dy165	Dy	133	1.2375	0.1365000000000000...	MWP-2.0b6.27	ENDFB-VI.8
DCA-HWR-EXP-001...	B1-1	137	Beta Decay Dy165	Dy	133	1.5165	0.2724999999999999...	MWP-2.0b6.27	JENDL-3.3
DCA-HWR-EXP-001...	B1-8	137	Beta Decay Dy165	Dy	133	1.51	0.2669999999999999...	MCNPS	ENDFB-VI.8
HTTR-GCR-RESR-0...	NULL	131	NULL	U235	129	0.69728	0.3533745146441662	MCNPS	ENDFB-VI.8
KRIT2-LWR-RESR-0...	NULL	135	600 keV>	Fuel Rod	129	0.791356	0.16096492060073...	MCNPS	ENDFB-VII.0
KRIT2-LWR-RESR-0...	NULL	135	600 keV>	Fuel Rod	129	0.6660666666666666	0.2758862479759044	MCNPS	ENDFB-VII.0
DCA-HWR-EXP-001...	B1-7	137	Beta Decay Dy165	Dy	133	1.4620000000000002	0.251	MCNPS	ENDFB-VI.8
BFS1-LMFR-EXP-00...	NULL	132	NULL	U238	129	0.6111185185185185	0.3581405642078799	TRIGEX	ABRN93.01
DCA-HWR-EXP-001...	A1-14	137	Beta Decay Dy165	Dy	133	1.2375	0.1365000000000000...	MWP-2.0b6.27	JEFF-3.0
BFS1-FUND-EXP-00...	NULL	132	NULL	U235	129	0.9314285714285714	0.08184106049944...	MCNPS	ENDFB-VI.8
DCA-HWR-EXP-001...	B1-1	137	Beta Decay Dy165	Dy	133	1.5165	0.2724999999999999...	MWP-2.0b6.27	JEFF-3.0
SNEAK-LMFR-EXP-0...	NULL	131	NULL	U238	129	0.6671428571428571	0.3250222389042216	TRANSV/THREEDANT	ENDFB-VI.8
DCA-HWR-EXP-001...	B1-1	137	Beta Decay Dy165	Dy	133	1.5165	0.2724999999999999...	MCNPS	ENDFB-VI.8
DCA-HWR-EXP-001...	A1-22	137	Beta Decay Dy165	Dy	133	1.441	0.236	MCNPS	ENDFB-VI.8
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	0.14744827586206...	0.0593183033954698	CITATION	JENDL-3.2
BFS1-LMFR-EXP-00...	B1-7	137	Beta Decay Dy165	Dy	133	1.4620000000000002	0.251	MWP-2.0b6.27	ENDFB-VI.8
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	1.4707142857142859	0.617923745378053	CITATION	JENDL-3.2
ZPPR-LMFR-EXP-00...	NULL	130	529.9 keV, 658.1 k...	U238	129	0.1574619047619048	0.0677302420755306	CITATION	JENDL-3.2



Search Similar Option

Why: Inter and intra comparison of experiments

Designer/Nuclear data validator can search for experiments which mimic the desired application.

Examples:

- Similar Spectrum (done)
- Similar Balance (done)
- Similar Sensitivity (no sensitivity data)
- Similar Uncertainty (uncertainties recently added)
- Correlations of uncertainties of measurements
- Correlations of uncertainties due to nuclear data

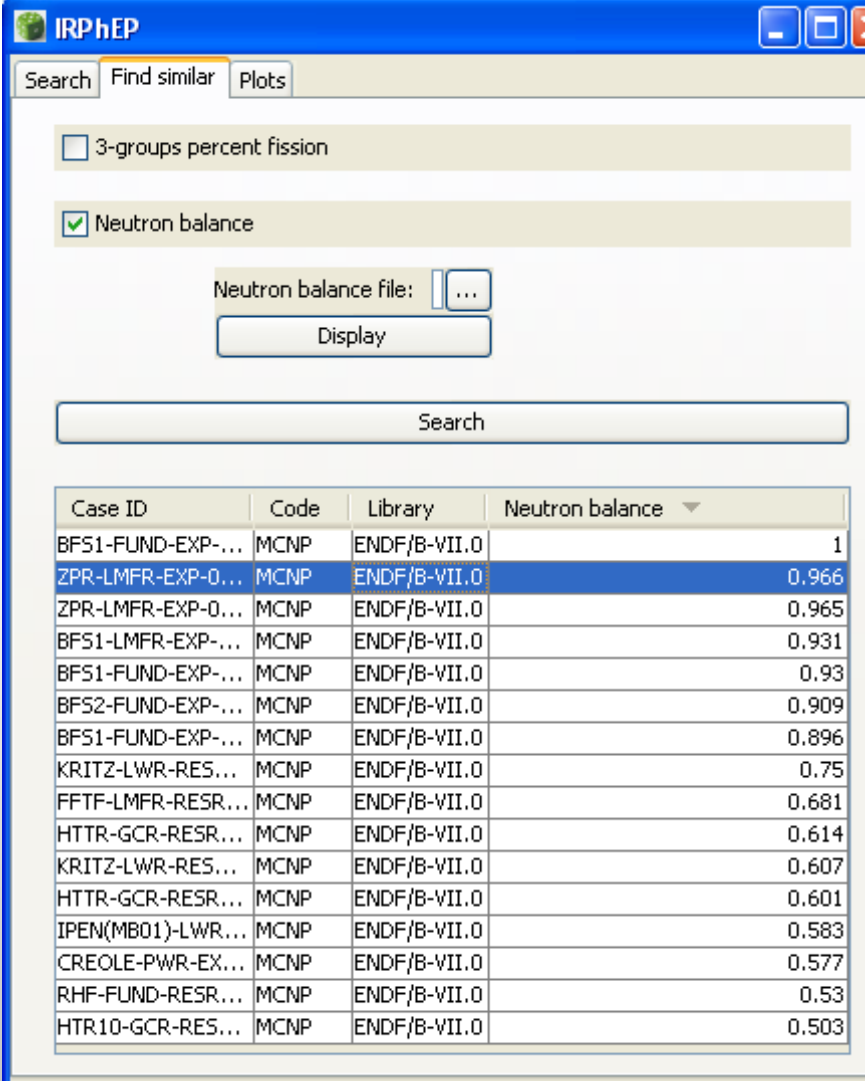
For Neutron Balance Files

Similarity based on Euclidean Distance

$$1 - \frac{\sqrt{(p_1 - q_1)^2 + (p_2 - q_2)^2 + \dots + (p_N - q_N)^2}}{2^{0.5} \times \|p\|^{0.5} \|q\|^{0.5}} \quad N = \text{Isotope}$$

Future Application: Use similarity metrics to compare results from different nuclear data libraries and codes.

Possible links/synergy with uncertainty information?



The screenshot shows the IRPhEP software interface. At the top, there are tabs for 'Search', 'Find similar', and 'Plots'. Below the tabs, there are two checkboxes: '3-groups percent fission' (unchecked) and 'Neutron balance' (checked). A 'Neutron balance file:' field with a browse button (...) and a 'Display' button are also visible. A large 'Search' button is located below the checkboxes. At the bottom, a table displays search results with columns for Case ID, Code, Library, and Neutron balance.

Case ID	Code	Library	Neutron balance
BF51-FUND-EXP-...	MCNP	ENDF/B-VII.0	1
ZPR-LMFR-EXP-0...	MCNP	ENDF/B-VII.0	0.966
ZPR-LMFR-EXP-0...	MCNP	ENDF/B-VII.0	0.965
BF51-LMFR-EXP-...	MCNP	ENDF/B-VII.0	0.931
BF51-FUND-EXP-...	MCNP	ENDF/B-VII.0	0.93
BF52-FUND-EXP-...	MCNP	ENDF/B-VII.0	0.909
BF51-FUND-EXP-...	MCNP	ENDF/B-VII.0	0.896
KRITZ-LWR-RESR...	MCNP	ENDF/B-VII.0	0.75
FFTF-LMFR-RESR...	MCNP	ENDF/B-VII.0	0.681
HTRR-GCR-RESR...	MCNP	ENDF/B-VII.0	0.614
KRITZ-LWR-RESR...	MCNP	ENDF/B-VII.0	0.607
HTRR-GCR-RESR...	MCNP	ENDF/B-VII.0	0.601
IPEN(MB01)-LWR...	MCNP	ENDF/B-VII.0	0.583
CREOLE-PWR-EX...	MCNP	ENDF/B-VII.0	0.577
RHF-FUND-RESR...	MCNP	ENDF/B-VII.0	0.53
HTR10-GCR-RES...	MCNP	ENDF/B-VII.0	0.503

Plotting Neutron Balance Files



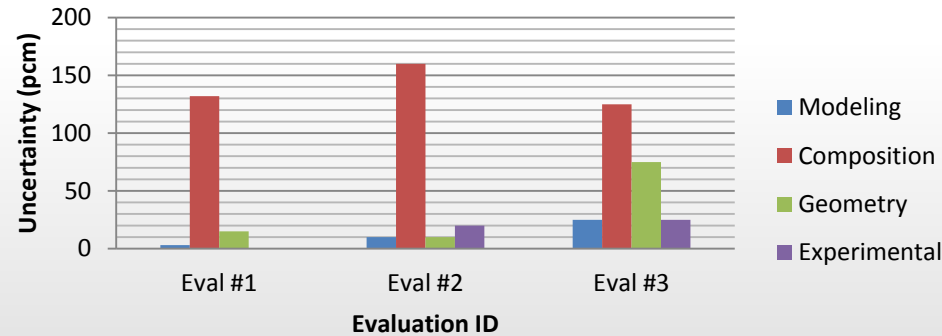
Uncertainties Short + Medium + Long Term

Extract Uncertainties IRPhEP
 (Name of Perturbation, parameter base value, parameter units, parameter uncertainty, delta k)

Source of Uncertainty	Standard Uncertainty of Parameter		Standard Uncertainty in Δk_e	
	T = 21.1 °C	T = 235.9 °C	T = 21.1 °C	T = 235.9 °C
Fuel				
Density	5 %/ $\sqrt{3}$	5 %/ $\sqrt{3}$	± 0.0002	± 0.0002
²⁴¹ Pu and ²⁴¹ Am content	1.6 at. %	1.6 at. %	± 0.00006	± 0.00006
PuO ₂ content	0.005 %	0.005 %	± 0.0008	± 0.0008
U enrichment	0.005 %	0.005 %	± 0.0006	± 0.0006
²³⁴ U content	0.0064 wt. %	0.0064 wt. %	± 0.0007	± 0.0007
Pu isotopic composition	0.005 at. %	0.005 at. %	± 0.00003	± 0.00003



GROUP
 Geometry
 Composition
 Experimental
 Modeling



GROUP
 Fuel
 Cladding
 Coolant/Moderator
 Core

Cross Check
 Composition
 Uncertainties Against
 Sensitivities

Trend
 Uncertainties vs.
 Other Database
 Parameters

Feedback
 Guidance to Future
 Evaluators

Compare
 Experimental+
 Nuclear Data+
 Modeling
 Uncertainties to
 actual C/E

Compare(2)
 Possible sanity check
 cross check against
 difference in balance
 files upon direct
 perturbations

Sensitivities Medium + Long Term

Collect Sensitivities

(Accept various formats likely. Possibility to impose format, but reluctant to dissuade users)

Allow user to link to co-variance data file + compute nuclear data uncertainty

Allow users to perturb reactions, observe impact on plots

Implement a generalized least squares option to automatically adjust data

Link sensitivities to Mesh Viewer Tool

Compare across codes, libraries, models

Conclusion

NEA/OECD have a long history of collecting and leveraging benchmark data

- ✓ **ICSBEP (1992/1995)**
- ✓ **DICE (2001)**
- ✓ **IRPhEP (2000)**
- ✓ **IDAT prototype (2012) [A technical advisory group being formed for IDAT]**

Done:

- Initial stage of database and analysis tool
- Most of the information content has been entered
- Design of prototype user interface

In Progress:

- New Plotting Features, adding SPEC, REAC, COEF data
- Error Checking
- Assemble Spectra and Neutron balance data
- Compile uncertainty data. Compute or collect sensitivity data.
- Priority list of features (Eventually public?)

Soon:

- Additional measurements
- Upgrade to 2011 data

Feedback Welcome!
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