

Measurement Exercise “Gamma Spectrometry”

ITU, Karlsruhe , 10th Feb. 2009

NUCLEONICA:
A WEB PORTAL FOR THE NUCLEAR SCIENCES

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NUCLEONICA:SNAP Science Networking and Applications Portal

1. What is Nucleonica? Underlying philosophy
2. Nucleonica web portal www.nucleonica.net
3. Social networking aspects
4. Nuclear science applications
5. Training courses
6. Karlsruhe Nuclide Chart
7. Future developments: SciencePipes



Knowledge and Learning: Overview

Knowledge and learning have been the subject of study for centuries. Aristotle differentiated between various types of knowledge and how they are acquired. In the eighteenth century, Adam Smith developed a theory of knowledge to be gained through "division of labour" and based on repeating well defined tasks. However, since the early 1990s, the "knowledge economy" or "knowledge society" has gained increasing attention in management circles with many large organizations engaging in a range of knowledge and learning activities. Some of the reasons for these developments are as follows...

Knowledge and Learning: Overview...

1. *The realization that the Western world (and Japan) were increasingly producing and profiting more and more from services and making fewer tangible goods. This substantial economic shift was a result of manufacturing moving to "less developed" nations because of lower costs.*

2. *Increasing importance is being given to an organization's competences and capabilities rather than material and financial resources. As a consequence, organizations began to realize that their most valuable resource could be found in the brains of their employees.*

3. *The impact of the "learning by doing" school of thought (Constructionism), on how expertise develops in practice.*

4. *The geographically dispersed nature of organizations which leads to the formation of virtual teams operating in a cyber-environment.*

5. *Knowledge related technologies i.e. the proliferation of knowledge and learning tools. However, technology driven approaches (pushed by vendors of software for example) need to be used with care to ensure that they play only a subordinated role in the management of people and processes.*

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NUCLEONICA: A Platform for Knowledge Management, Education and Training

Types of Knowledge : Explicit vs. Tacit

It is generally accepted that different types of knowledge have very different characteristics. Explicit knowledge, for example, consists of facts, sets of instructions, etc. Implicit knowledge, on the other hand, is more related to know-how. These different types of knowledge have, of course, very different characteristics with regard, for example, to transferability. Explicit knowledge is transferable from person to person, across space and time. In contrast, tacit knowledge cannot be easily articulated and its transfer is slow and uncertain. As a consequence, explicit knowledge is not the basis of sustainable advantage over other organisations (except in the form of copyrights, patents, etc.). It is more the tacit knowledge that fits this role and this is notoriously difficult to transfer - even within the organization itself.



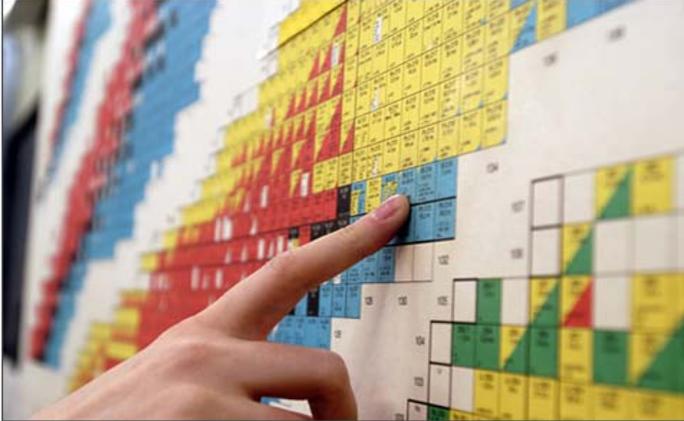
nucleonica ... web driven nuclear science

Sunday, November 18, 2007

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Nucleonica - web driven nuclear science



NUCLEONICA is a new nuclear science web portal from the European Commission's Joint Research Centre. The portal provides a customisable, integrated environment and collaboration platform for the nuclear sciences using the latest internet "Web 2.0" dynamic technology.

NUCLEONICA is aimed at professionals, academics and students working with radionuclides in fields as diverse as the life sciences (e.g. biology, medicine, agriculture), the earth sciences (geology, meteorology, environmental science) and the more traditional disciplines such as nuclear power, health physics and radiation protection, nuclear and radiochemistry, and astrophysics. It is also used as a knowledge management tool to preserve nuclear knowledge built up over many decades by creating modern web-based versions of so-called legacy computer codes.

NUCLEONICA provides "software as a service" on the web rather than through installed software, adding a greater level of stability and security and avoiding version compatibility and update problems. In addition, all **NUCLEONICA**'s web applications are browser and operating system independent and can therefore be accessed by most web browsers.

NUCLEONICA offers the following main features:

- » **Data Centre:** Online interactive nuclide charts, Reference data and searchable databases for internationally evaluated nuclear data, Library creation software

NUCLEAR NEWS

French FM: France is not ruling out a military strike on Iran

NOV 18 Even though in Tehran the IAEA's report was described as a "political victory" that may prevent the intensifying of international sanctions, Kouchner says that "for now Iran persists in not meeting it [...]"

Iran: UNSC interference illegal

NOV 18 Mohammad Saeedi, a senior Iranian nuclear official has said insistence on pursuing Iran's nuclear program at the Security Council lacks legal grounds, PressTV reported. [...]

Iran says ready to act if attacked ...

NOV 18 LONDON, November 18 (IranMania) - Hardline Iranian President Mahmoud Ahmadinejad said Iran was ready to respond if attacked, but played down the prospect of war with the United States, Reuters reports [...]

'Safe' uranium that left a town contaminated

NOV 18 It is 50 years since Tony Ciarfello and his friends used the yard of a depleted uranium weapons factory as their playground in Colonie, a suburb of Albany in upstate New York state. "There wasn't no f [...]"

Chavez dealing pain to Spain

NOV 18 Chavez, who has nationalised large parts of the economy this year under his self-styled socialist "revolution", said last week he will revise diplomatic and business ties with the

NUCLEONICA HOT TOPICS

» [Open Call for JRC Traineeships](#)

November 14, 2007

ITU's first open call for JRC-Traineeships has been published on our website. The deadline for applications is 6 December 2007 (midnight). In particular we have a position for assistance in the development of an electronic version of the Karlsruhe







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> **Upgrade Applications**

- >> [nuclear science](#)

> **Coming soon**

- >> [New! 50th Anniversary of the Karlsruhe Nuclide Chart](#)

- >> [Gamma Spectrum Generator](#)

- >> [easyMonteCarlo for Dosimetry & Shielding with Neutrons & Gammas](#)



>> **[New Nucleonica Training Course](#)** Januar 31, 2009

1st Advanced Training Course on Illicit Trafficking and Consequence Management with NUCLEONICA will take place on the 22-24th April 2009 at the Institute for Transuranium Elements, Karlsruhe

 **[Treatment head for Beatson named](#)**

The new head of treatment at the flagship Beatson West of Scotland Cancer Centre has been named as Dr David Dunlop. Dr Dunlop replaces Professor Alan Rodger, who retired as clinical director of the &...

Source: AfghanistanSun **Language:** EN **Date:** 2009-02-10T08:20+0100

 **[Development of uranium deposits new Russian project in Armenia this year](#)**

YEREVAN, February 5. /ARKA/. The development of uranium deposits will be a new Russian project in Armenia this year, RF Ambassador to Armenia Nikolay Pavlov told a press conference at the international press center Novosti. The Armenian-Russian Mining Company established last September is developing uranium deposits in Armenia.

Source: arka_am **Language:** EN **Date:** 2009-02-10T08:19+0100

 **[Obama says US, Russia must work to halt nuclear proliferation](#)**

WASHINGTON: US President Barack Obama said Monday the United States and Russia should lead the way in preventing nuclear proliferation by restarting negotiations to cut their atomic arsenals.

Source: channelnewsasia **Language:** EN **Date:** 2009-02-10T07:59+0100

 **[Obama says US looking for Iran talks in coming months](#)**

WASHINGTON: US President Barack Obama on Monday renewed his call for direct US dialogue with Iran, saying he hoped to create the conditions to "start sitting across the table, face to face" in the coming months.

Source: channelnewsasia **Language:** EN **Date:** 2009-02-10T07:59+0100

 **[Research and Markets: Analysis of the World's Third Biggest Uranium Supplier as Production Targets to Increase Investments in Kazakhstan's Uranium Mining Industry](#)**

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-  You have 0 new contact list requests

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	Dr. Inrich Fabry		Roelf Blaauboer
	Emily Simmonds		Emily Alice Kroeger

Community Members Pending Contacts

- all Users
 my Contacts

Image	Name	Organization
	MARTINA ADORNI	University of Pisa - DIMNP - GRNSPG
	Aleksandra Schwenk-Ferrero	Forschungszentrum Karlsruhe - Institute for
	Mikael Andersson	Westinghouse Electric Sweden AB
	Martin Badertscher	
	Remigiusz Baranczyk	European Commission DG TREN
	Enrico Barbina	Nabla Progetti Srl
	Valerio Barbina	Nabla Progetti Srl
	Bjoern Becker	Forschungszentrum Karlsruhe GmbH, Institut
	Fabio Belloni	European Commission, DG-JRC, Institute fo
	Andrey Berlizov	Institute for Transuranium Elements, EC JRC
	Yuri Bilodid	Forschungszentrum Dresden-Rossendorf
	Emilie BOSSE	CEA
	Berkan Cetinkaya	Ege University, Institute of Nuclear Sciences
	Vanessa Chisté	
	Catalina Chitu	

Profile Contacts

Simon Jerome National Physical Laboratory



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Name	Simon Jerome
Location	United Kingdom
Nationality	British
Organization	National Physical Laboratory
Job Title	Head of Radiochemistry
Areas Of Interest	Radiochemistry; Analytical Chemistry; Radiochemical Analysis; Low-level radioactivity measurement; Inter-laboratory comparisons and proficiency testing; ISO 17025:2005 Technical Assessor; ISO Guide 43
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Organization	Loughborough University
Address	Ashby Road Loughborough Leics LE11 3TU UK
Job Title	Lecturer in Radiochemistry
Areas Of Interest	Migration of radionuclides in the environment Effect of organics, natural and anthropogenic, on radionuclide transport
Latest Publications	Muhammad Haleem Khan, Peter Warwick and Nick Evans, Spectrophotometric Determination of Uranium with Arsenazo-III in Perchloric Acid, Chemosphere, 63, 2006, p 1165 Peter Warwick, Nick Evans and Sarah Vines, Studies on some divalent Metal a-Isosaccharinic Acid Complexes, Radiochimica Acta, 94(6-7), 2006, pp 363-369. S. Aldridge, P. Warwick, N. Evans and S. Vines., Degradation of tetraphenylphosphonium bromide at high pH and its effect on radionuclide solubility, Chemosphere, 66(4), 2007, pp

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Nuclides.net	Nuclides 2000	Overview of Nucleonica
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WebKORIGEN	Wedge Model for Radiological Dispersion	

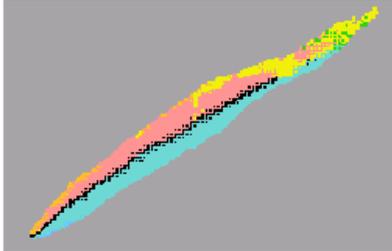
Nuclear science applications...



... web driven nuclear science

Applications My Preferences Help

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» Actual Chart: Karlsruhe

> Search Nucleonica Documentation

Nuclear Data Retrieval



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- » easy Monte Carlo (IE only)
- » Extended Graph Module

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- » Radiations
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Edit Preferences	Administration
MyCommunity Portal	

> My Last Nuclides

- ☒ 63 Eu152
- ☒ 84 Po210
- ☒ 27 Co60
- ☒ 37 Rb98
- ☒ 37 Rb88

> My Nuclide Mixtures

- 📖 Natural Thorium
- 📖 Natural Uranium
- 📖 U232+Co60
- 📖 Cs137 + Ba137m
- 📖 Depleted Uranium (0.4%U235)

> My Sources

- 📖 Pu239 1 g
- 📖 natu

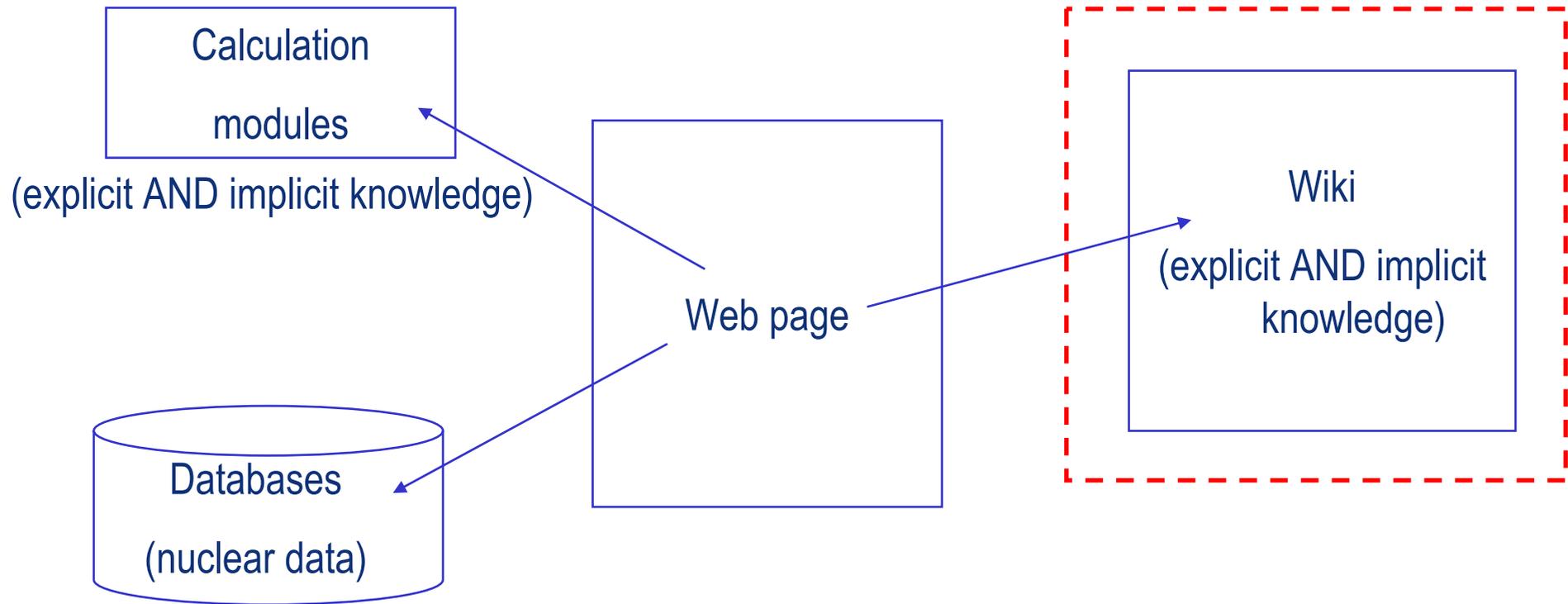
> My Messages

No messages for you at the moment

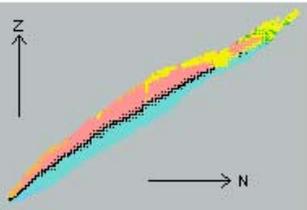
> User Alerts

No alerts at the moment

Nucleonica Architecture & Logical Structure...



The NUCLEONICA Structure



Select

Element: Mass:

None None

Zoom

View: [Icons]

User defined

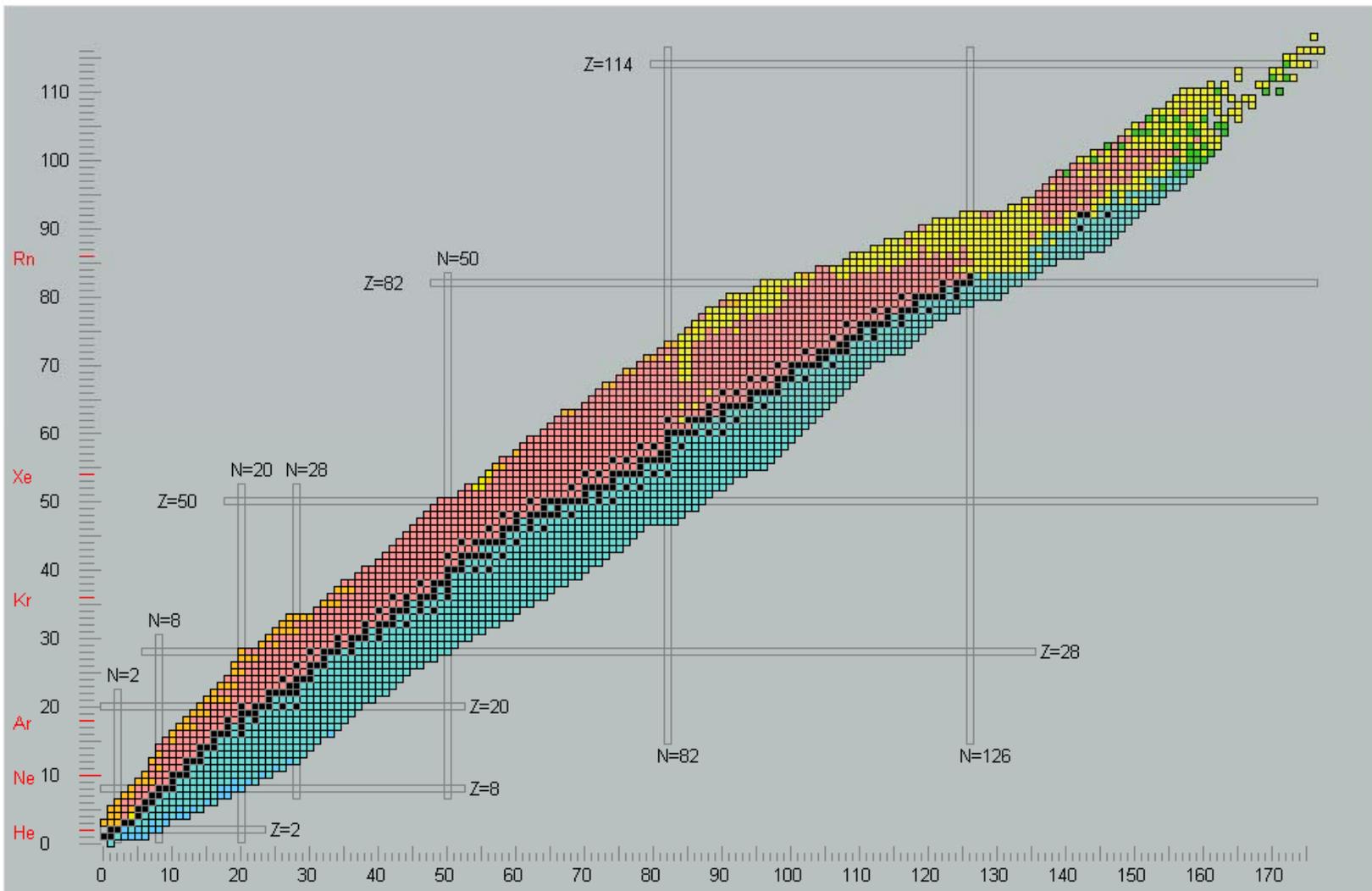
Select colour theme:

Karlsruhe

- alpha
- beta⁻
- ec/beta⁺
- IT
- n
- SF
- p
- ec
- CE
- stable

All None

Background



Ground state: 3127 nuclides from 3127

Metastable: 769 nuclides from 769

Total: 3896 nuclides from 3896

Data centre...

Nucleonica Data Retrieval

Search Results: Actual Chart: Karlsruhe

Isotope	Energy	Half-life	Decay Mode
82 Pb210	54.9 MeV	22.3 y	β ⁻
84 Po210	5.4 MeV	138 d	α
86 Rn222	5.5 MeV	3.8 d	α
88 Ra226	4.8 MeV	1600 y	α
90 Th230	4.7 MeV	75400 y	α
92 U234	4.8 MeV	245500 y	α
94 Pu238	5.5 MeV	87.7 y	α
96 Cm246	6.9 MeV	11.3 y	α
98 Cf250	6.7 MeV	13.1 y	α
100 Fm254	10.2 MeV	2.01 h	α
102 No259	8.0 MeV	3.1 min	α
104 Lr260	8.8 MeV	3.8 h	α
106 Th232	4.0 MeV	14.1 y	α
108 Ra228	4.9 MeV	5.75 y	α
110 Ac227	5.9 MeV	21.8 y	α
112 Th231	5.4 MeV	25.5 h	α
114 Pa231	5.2 MeV	32.7 y	α
116 U235	4.8 MeV	70400 y	α
118 Th234	4.7 MeV	24.1 d	α
120 Ra226	4.8 MeV	1600 y	α
122 Th230	4.7 MeV	75400 y	α
124 U234	4.8 MeV	245500 y	α
126 Pu239	5.2 MeV	24110 y	α
128 Pu241	5.2 MeV	14.3 y	α
130 Pu243	5.2 MeV	4.95 h	α
132 Pu245	5.2 MeV	1.65 h	α
134 Pu247	5.2 MeV	41.8 min	α
136 Pu249	5.2 MeV	33.3 min	α
138 Pu251	5.2 MeV	10.8 min	α
140 Pu253	5.2 MeV	4.35 min	α
142 Pu255	5.2 MeV	1.67 min	α
144 Pu257	5.2 MeV	43.5 min	α
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530 Pu643	5.2 MeV	1.13 min	α
532 Pu645	5.2 MeV	1.13 min	α
534 Pu647	5.2 MeV	1.13 min	α
536 Pu649	5.2 MeV	1.13 min	α
538 Pu651	5.2 MeV	1.13 min	α
540 Pu653	5.2 MeV	1.13 min	α
542 Pu655	5.2 MeV	1.13 min	α
544 Pu657	5.2 MeV	1.13 min	α
546 Pu659	5.2 MeV	1.13 min	α
548 Pu661	5.2 MeV	1.13 min	α
550 Pu663	5.2 MeV	1.13 min	α
552 Pu665	5.2 MeV	1.13 min	α
554 Pu667	5.2 MeV	1.13 min	α
556 Pu669	5.2 MeV	1.13 min	α
558 Pu671	5.2 MeV	1.13 min	α
560 Pu673	5.2 MeV	1.13 min	α
562 Pu675	5.2 MeV	1.13 min	α
564 Pu677	5.2 MeV	1.13 min	α
566 Pu679	5.2 MeV	1.13 min	α
568 Pu681	5.2 MeV	1.13 min	α
570 Pu683	5.2 MeV	1.13 min	α
572 Pu685	5.2 MeV	1.13 min	α
574 Pu687	5.2 MeV	1.13 min	α
576 Pu689	5.2 MeV	1.13 min	α
578 Pu691	5.2 MeV	1	



Nuclear Data Retrieval

Nucleonica/JEFF-3.1 EGAF Prompt Gammas ICRP 8th Table of Isotopes

Select Database: Nucleonica

Nuclide Search Radiation Search Advanced Search

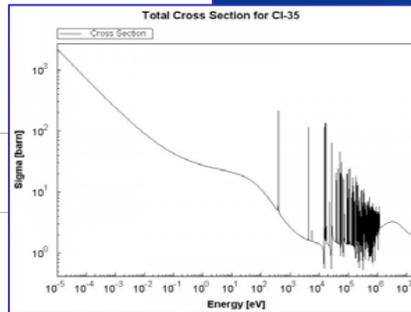
Radiation Search - Search Variables & Range

Gamma and X-Rays Energy: 300 +/- 1 keV
 Alpha Energy: 600 +/- 1 keV
 Z: 900 +/- 1 keV
 Mass number:
 Half-life: Seconds - Seconds

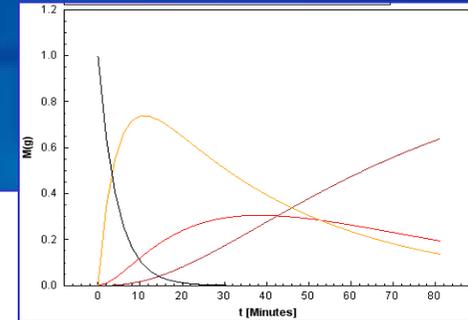
Search Save to my defaults Reset

Search returned 8 results
Number of nuclides (ground + isomeric states): 2

Nuclides	Gamma and X-Rays (keV)	Emission Probability	Half-life
60 Nd 151	900.2	0.001463	12.44 (± 7) m
95 Am 241	899	6.84E-10	432.8 (± 7) y
60 Nd 151	600.8	0.0002527	12.44 (± 7) m
95 Am 241	599.6	2.232E-09	432.8 (± 7) y
60 Nd 151	300.58	0.018221	12.44 (± 7) m
95 Am 241	300.2	1.189E-07	432.8 (± 7) y



Powerful tools...



Decay Engine 84 Polonium

Actual Chart: Karlsruhe

Element: Mass: Po 218 Nuclide Mixtures Selector

Decay Engine Options

Quantity: Grams 1 Accuracy Factor: 1E-02
 Time: Minutes 8.10E+01 Number of timesteps: 40 Number of chains: 1
 Start Start in background Reset Show details Create Nuclide Mixture

Parent+Daughters	Half-life	N(atoms)	M(g)	A(Bq)	Ing_Radiat(Sv)
84 Po218	3.1 m	3.72E+13	1.35E-08	1.39E+11	0
82 Pb214	26.8 m	3.84E+20	1.37E-01	1.66E+17	2.32E+07
83 Bi214	19.9 m	5.47E+20	1.94E-01	3.17E+17	3.49E+07
84 Po214	1.6E2 μs	7.50E+13	2.66E-08	3.17E+17	0
82 Pb210	22.17 y	1.83E+21	6.38E-01	1.81E+12	1.25E+06
83 Bi210	5.01 d	3.97E+15	1.38E-06	6.35E+09	8.26E+00
84 Po210	1.4E2 d	8.99E+12	3.13E-09	5.21E+05	6.25E-01
82 Pb206 Stable	stable	5.39E+08	1.84E-13	0	0
Total:		2.76E+21	9.69E-01	8.01E+17	5.94E+07

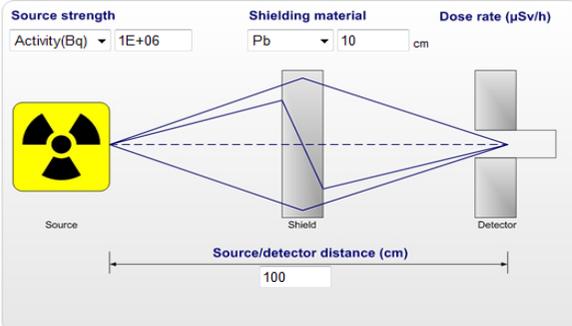


Dosimetry and Shielding 27 Cobalt

Actual Chart: Karlsruhe

Element: Mass: Co 60 Nuclide Mixtures Selector

Dosimetry and Shielding Options



Start Reset

Half-Value Shield Thickness(cm) 1.88E+00
 Tenth-Value Shield Thickness(cm) 4.90E+00

nucleonica



October 2007 Karlsruhe

9th Nuclear Science Training Course with Nucleonica, 25/26th Oct. 2007, Ostendorfhaus, Karlsruhe

The 9th Nuclear Science training course on Radioactivity, Radionuclides and Radiation with Nucleonica was held at the Ostendorfhaus, Karlsruhe from the 25th to 26th October, 2007. The two-day course provided a general introduction to the recently released Nucleonica: the new science networking and applications portal. Nucleonica is a powerful and versatile web-based software package for the nuclear science community. With examples and exercises, a variety of core and topical issues in nuclear science and technology were presented by experts in their respective fields.

A total of twenty-nine participants, around half of them women, with a diverse range of backgrounds attended the course. There were participants from Azerbaijan, Belgium, Bulgaria, Czech Republic, Poland, Romania and Turkey. In addition there were 10 participants from the Institute for Transuranium Elements. Among them were students, academics and industry professionals from fields such as nuclear medicine, radiation protection, environmental radioactivity and reactor physics.

Final Agenda 25th Oct. 2007

[How to get from the hotel to the conference training centre](#)

[Links to the presentations and exercises:](#)

[Networking with Nucleonica \(J. Magill\) Exercises](#)

[Nuclear Data \(J. Galy\) Exercises](#)

[Nuclide Charts \(C. Normand\) Exercises](#)

[Decay Engine \(A. Berlizov\) Exercises](#)

[Dosimetry & Shielding \(J. Galy\) Exercises](#)

[Nuclear Forensics & Illicit Trafficking \(K. Mayer\) Exercises](#)

[Overview of the Institute for Transuranium Elements \(F. Wastin\)](#)

[Advanced Nucleonica Features \(J. Magill\)](#)

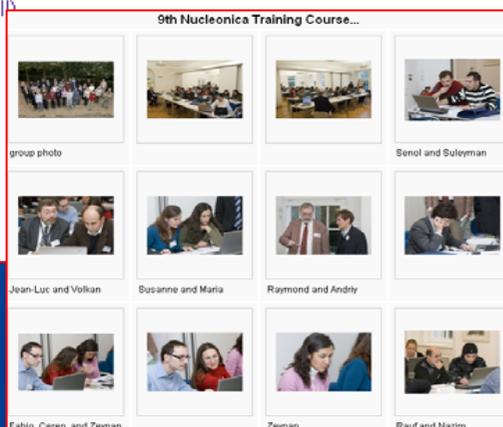
[Training Course Feedback](#)

[QM Questionnaire](#)

[Course Certificate](#)

[List of Participants](#)

[Gallery](#)



Group Photo Oct. 2007, Ostendorfhaus Karlsruhe





... web driven nuclear science

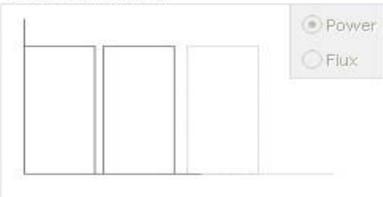
Applications My Preferences Print Help



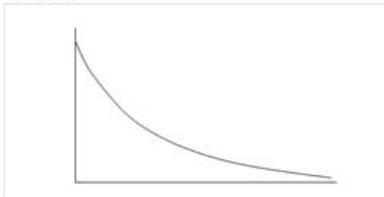
webKORIGEN

Step 1: Calculation Mode Step 2: Reactor / Operation Step 3: Input Summary and Run Step 4: Display Results

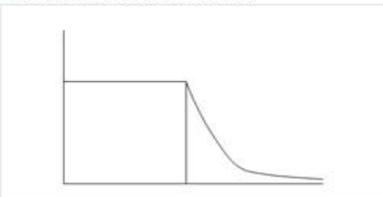
Reactor irradiation



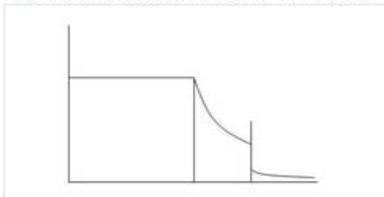
Decay



Reactor irradiation and decay



Reactor irradiation, cooling, reprocessing and decay



webKORIGEN

Step 1: Calculation Mode Step 2: Reactor / Operation Step 3: Input Summary and Run Step 4: Display Results

Display Results at 6 y for most important nuclides

Display quantity: Activity (Bq)

Top Nuclides	Results	Top Elements	Results	Totals	Results
Cs137	1.095E+17	Cesium	1.401E+17	Actinides:	1.130E+17
Ba137m	1.036E+17	Plutonium	1.054E+17	Fission Prod.	4.670E+17
Pu241	9.937E+16	Barium	1.036E+17	Total	5.800E+17
Y90	7.129E+16	Yttrium	7.129E+16		
Sr90	7.127E+16	Strontium	7.127E+16		
Cs134	3.065E+16	Promethium	2.917E+16		
Pm147	2.917E+16	Europium	1.209E+16		
Eu154	9.611E+15	Ruthenium	9.449E+15		
Rh106	9.449E+15	Rhodium	9.449E+15		
Ru106	9.449E+15	Krypton	7.199E+15		
Kr85	7.199E+15	Curium	6.249E+15		
Cm244	6.205E+15	Praseodymium	4.031E+15		
Pu238	5.291E+15	Cerium	3.983E+15		
Ce144	3.983E+15	Antimony	3.670E+15		
Pr144	3.983E+15	Americium	1.313E+15		
Sb125	3.669E+15	Tellurium	8.950E+14		
Eu155	2.477E+15	Neptunium	4.048E+14		
Am241	1.259E+15				
Te125m	8.950E+14				
Pu240	4.933E+14				

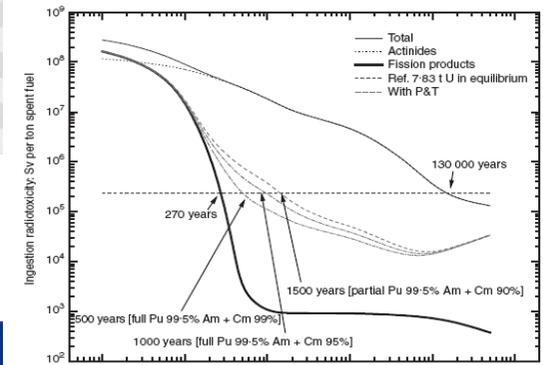
Neutron and gamma rates

Neutron rate: 2.491E+10 n/s

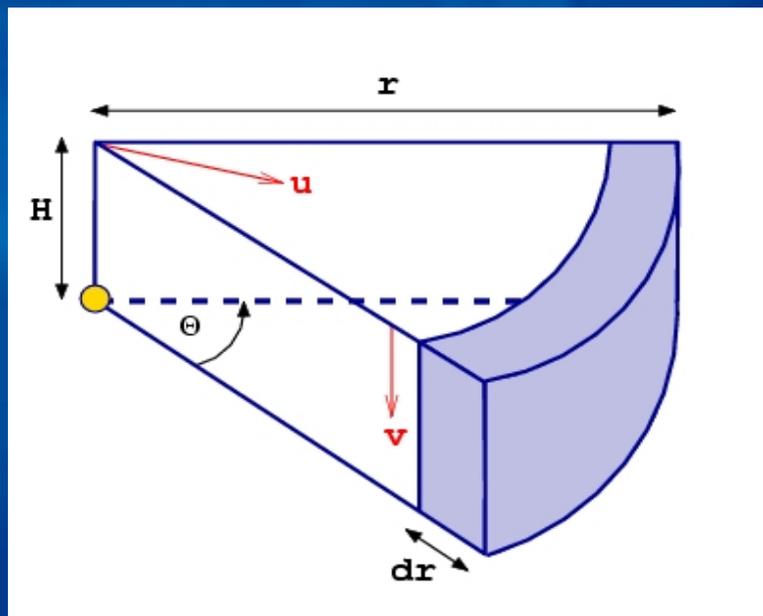
Gamma rate from Actinides: 6.427E+13 MeV/s

Highlight:

webKORIGEN



RDD module development within Nucleonica.



Modelling Activities:
Radiological consequences of an RDE involving radioactive and nuclear materials with the Wedge model.


... web driven nuclear science

Applications
My Preferences
Print
Help

Radiological Dispersion Module



Cobalt

Radionuclide: Co-60-0

Material

Quantity: Ci

Effective Dose Coefficient:

Activity:

Mass:

Wedge at:

Population density: per km²

Meteorology

Cloud height: m

Deposition velocity: m/s

Wind velocity: m/s

Opening angle: degrees

Acute Effect Dose Limit: Sv

Results

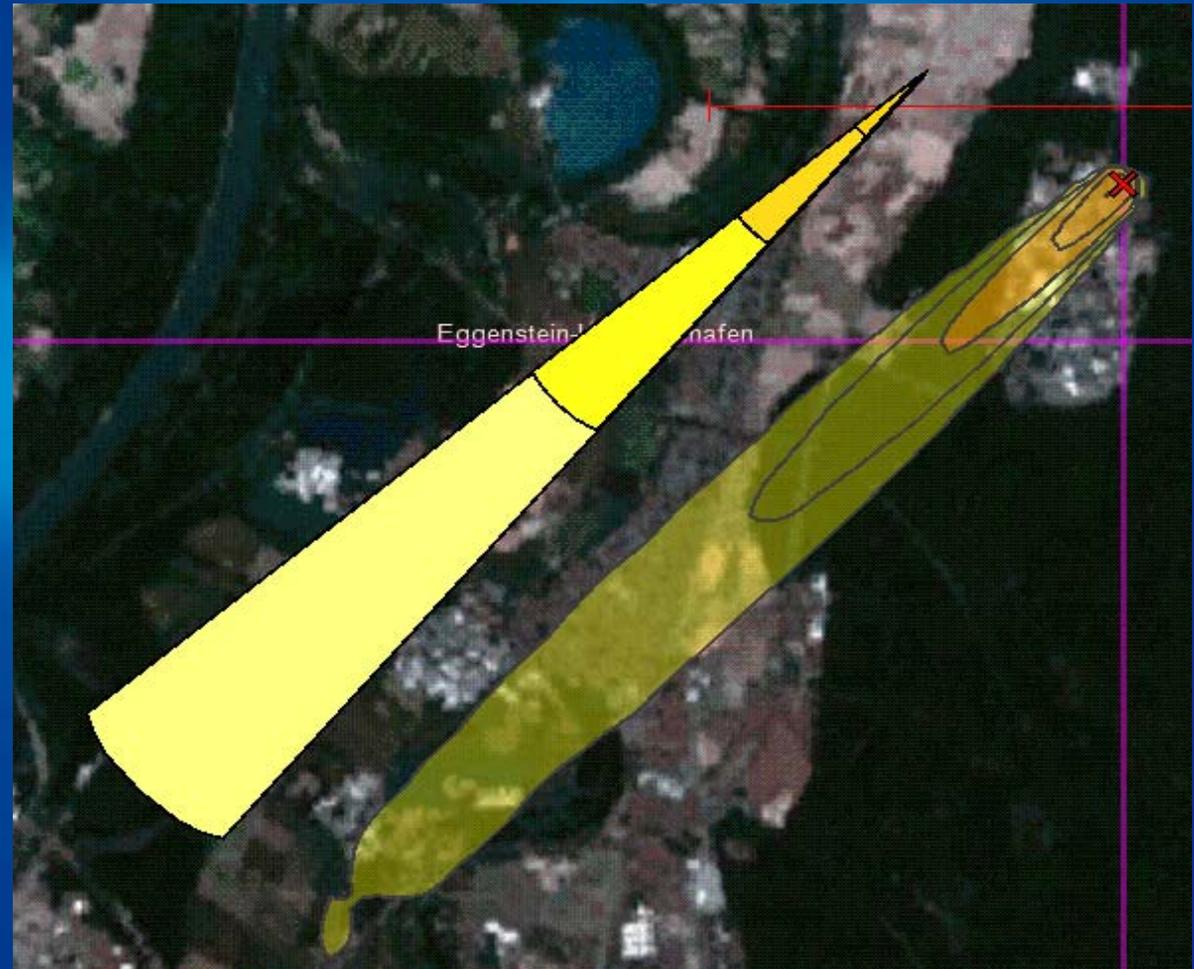
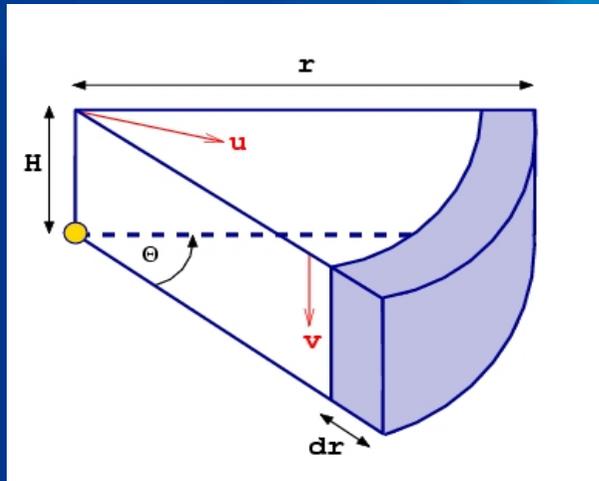
Distance [km]	Dose [mSv]	Time [min]
0.012	5000	0.039
0.059	1000	0.196
0.193	300	0.643
0.555	100	1.848
1.625	30	5.418
3.770	10	12.567
7.773	3	25.910
12.783	1	42.610
19.358	0.3	64.526

Summary

Characteristic Aerosol Range	8.33E+00	km
Characteristic Aerosol Lifetime	4.63E-01	h
Total intake activity by inhalation	8.66E+09	Bq
Collective Dose (<5.00 Sv)	2.69E+02	man Sv
Number of excess cancers	13	
Number of Acute Effects	0	
Acute Effect Distance	1.18E-02	km
Acute Effect Time	3.94E-02	min

- Modelling Activities: Radiological consequences of an RDE involving radioactive and nuclear materials.

Comparison of simple analytical models (WEDGE) and complex codes (LASAIR)



Gamma Spectrum Generator... can be used to simulate the gamma spectrum of radioactive substances with a variety of detectors (e.g. NaI, HPGe). The simulator presents an efficient visual teaching aid that is especially useful in training facilities which have restrictions on the use of radioactive substances, or when sources of special interest are not available.

of interests for...

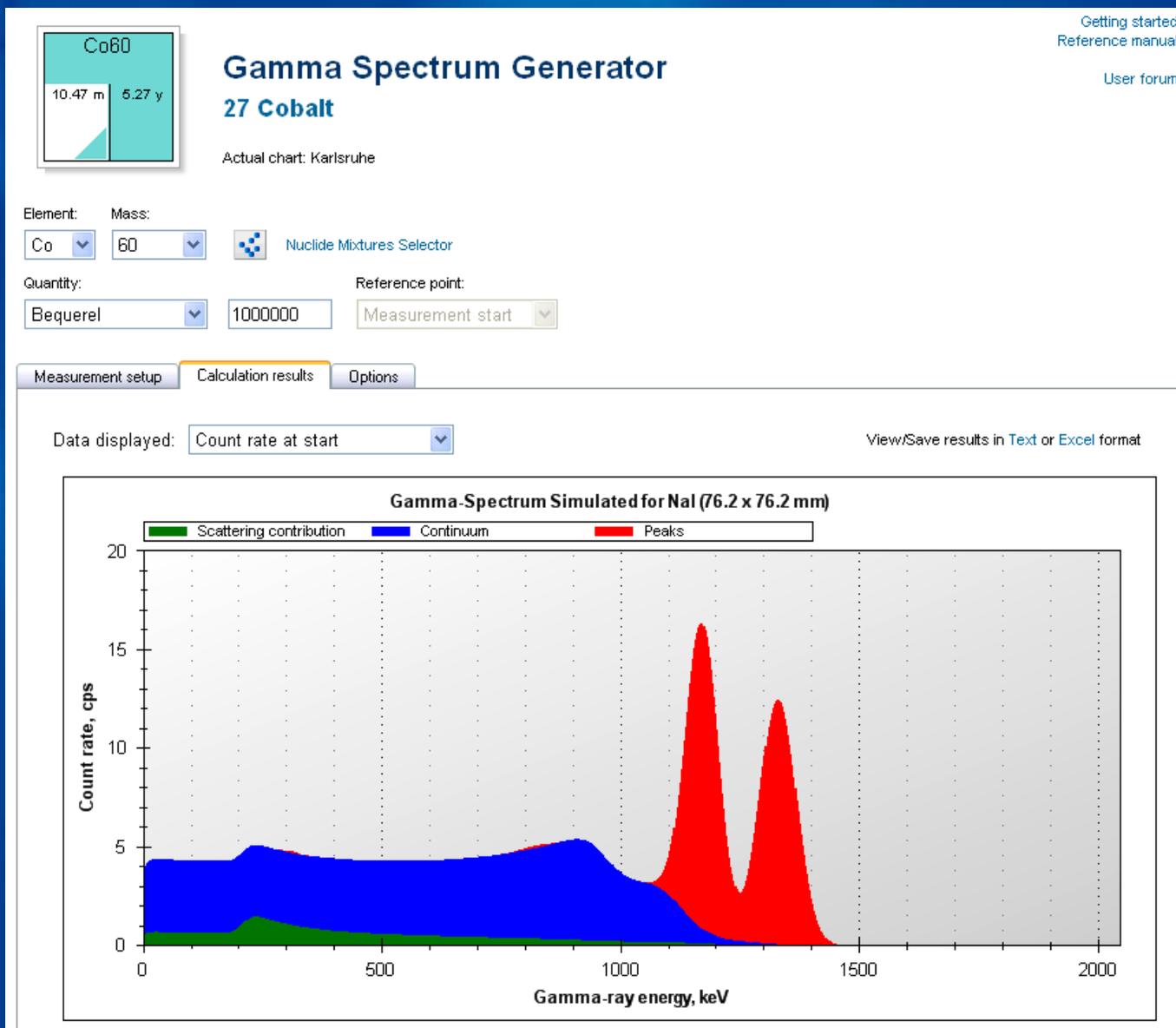
- nuclear and radio-chemists,
- health physicists,
- nuclear facility operators,
- radiation protection staff,
- safeguards inspectors,
- border police,
- customs and law-enforcement officers.

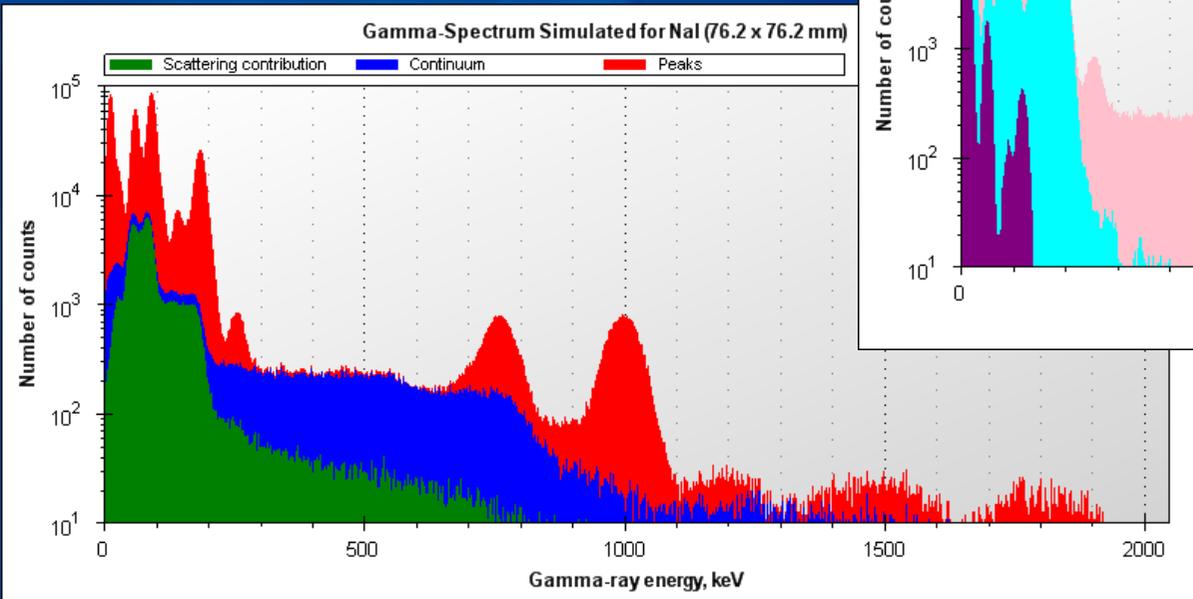
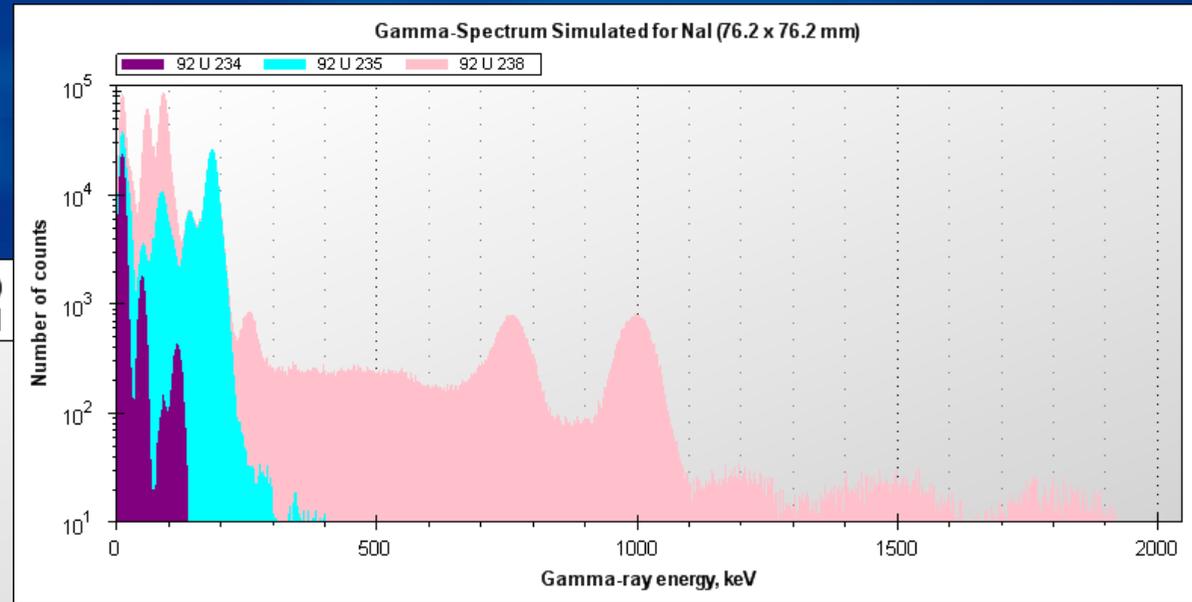
Needs for Education & Training in these areas are high and, obviously, they will be increasing in the future as new challenges arise, such as

- strengthening international safeguards and security,
- nuclear terrorism prevention

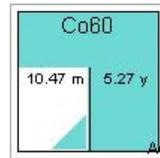
The screenshot shows the 'Gamma Spectrum Generator' web application. At the top, the 'nucleonica' logo is on the left and the tagline '... web driven nuclear science' is on the right. Below the logo is a navigation menu with 'Applications', 'My Preferences', 'Print', and 'Help'. The main content area features a 'Co60' nuclide card with half-life values of 10.47 m and 5.27 y. The title 'Gamma Spectrum Generator' and '27 Cobalt' are prominently displayed, with 'Actual chart: Karlsruhe' noted below. The interface includes input fields for 'Element' (Co), 'Mass' (60), 'Quantity' (Bequerel), and 'Reference point' (Measurement start). A 'Nuclide Mixtures Selector' button is also present. Below these are tabs for 'Measurement setup', 'Calculation results', and 'Options'. The 'Measurement setup' tab is active, showing 'Measurement time' set to 1000 seconds and a 'Start' button. The 'Current configuration' is set to 'NaI, L x D = 3 in x 3 in (default)'. A schematic diagram illustrates the detector setup: a 'Source' (red dot) is positioned 250.0 mm from a 'Filter' (vertical bar), which is in turn 76.2 mm from a 'NaI Crystal' (square). The crystal has a diameter of 76.2 mm. A 'Show more settings' checkbox is located at the bottom right of the diagram.

This “one-click” calculation simulates the spectrum for a 10 MBq ^{60}Co γ -source located at 25 cm distance from unshielded 3" x 3" NaI detector. A typical result of the calculation is shown...





The γ -spectrum modelled for a 10-year-aged natural U sample and 3"×3" NaI detector. The two diagrams show different presentations of the same spectrum. The top diagram shows the separate contributions from the parent and daughters of U-234, U-235, U-238. The bottom diagram shows the contributions from the peak and continuum components of the spectrum.



easyMonteCarlo
27 Cobalt

Dosimetry & Shielding with Neutrons & Gamma

Version: 2008.10.13 16:1

Element: Co Mass: 60 Mixture selector:

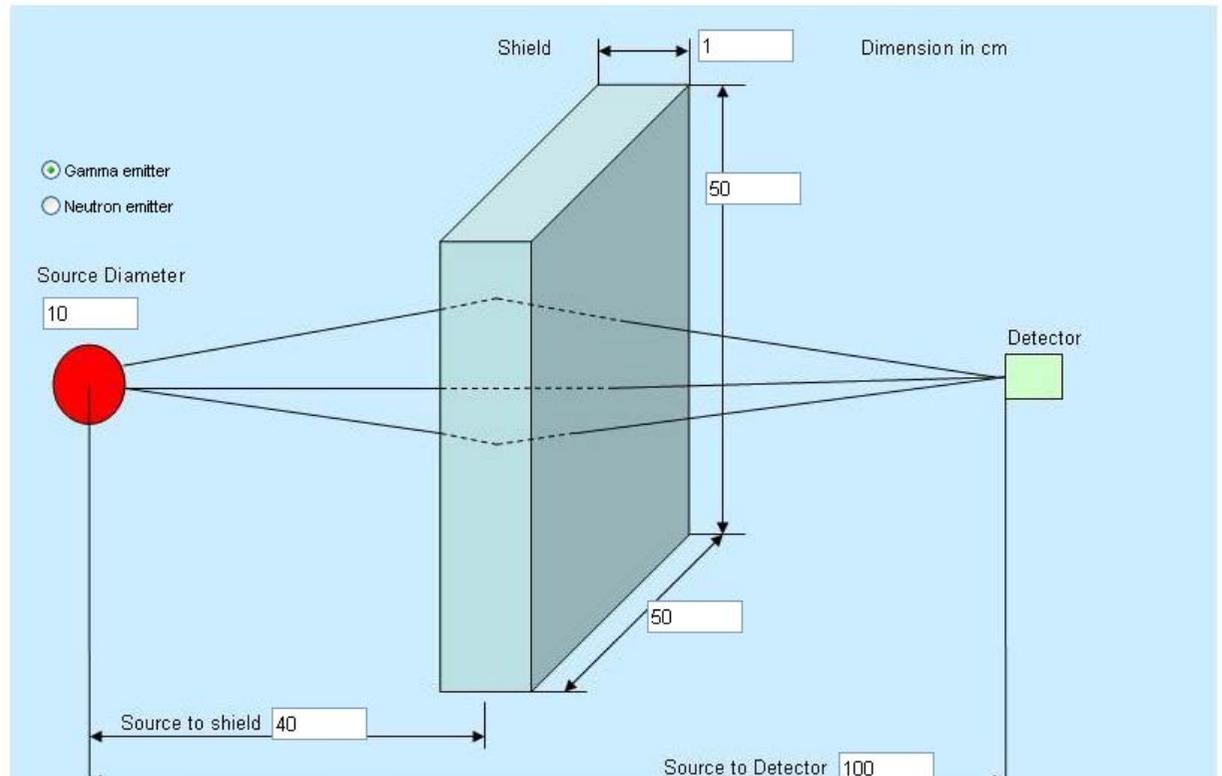
Activity (Ci): 1

Shield: Compound Paraffin Element Fe

Detector: Particle flux Dose rate

Start Stop Resume

Geometry Source Options Results Input Parameters Service Output



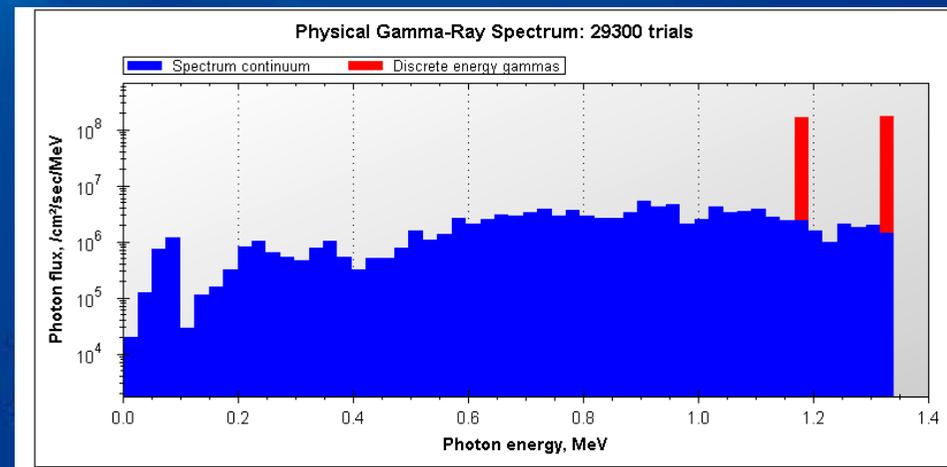
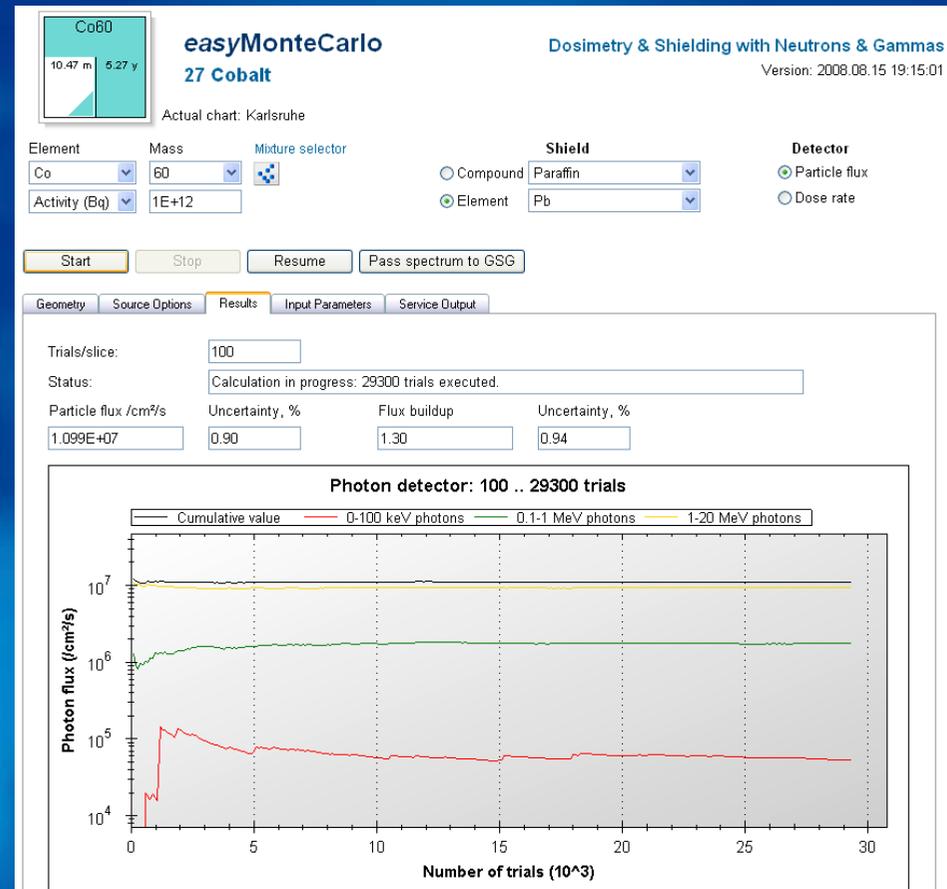
easyMonteCarlo:

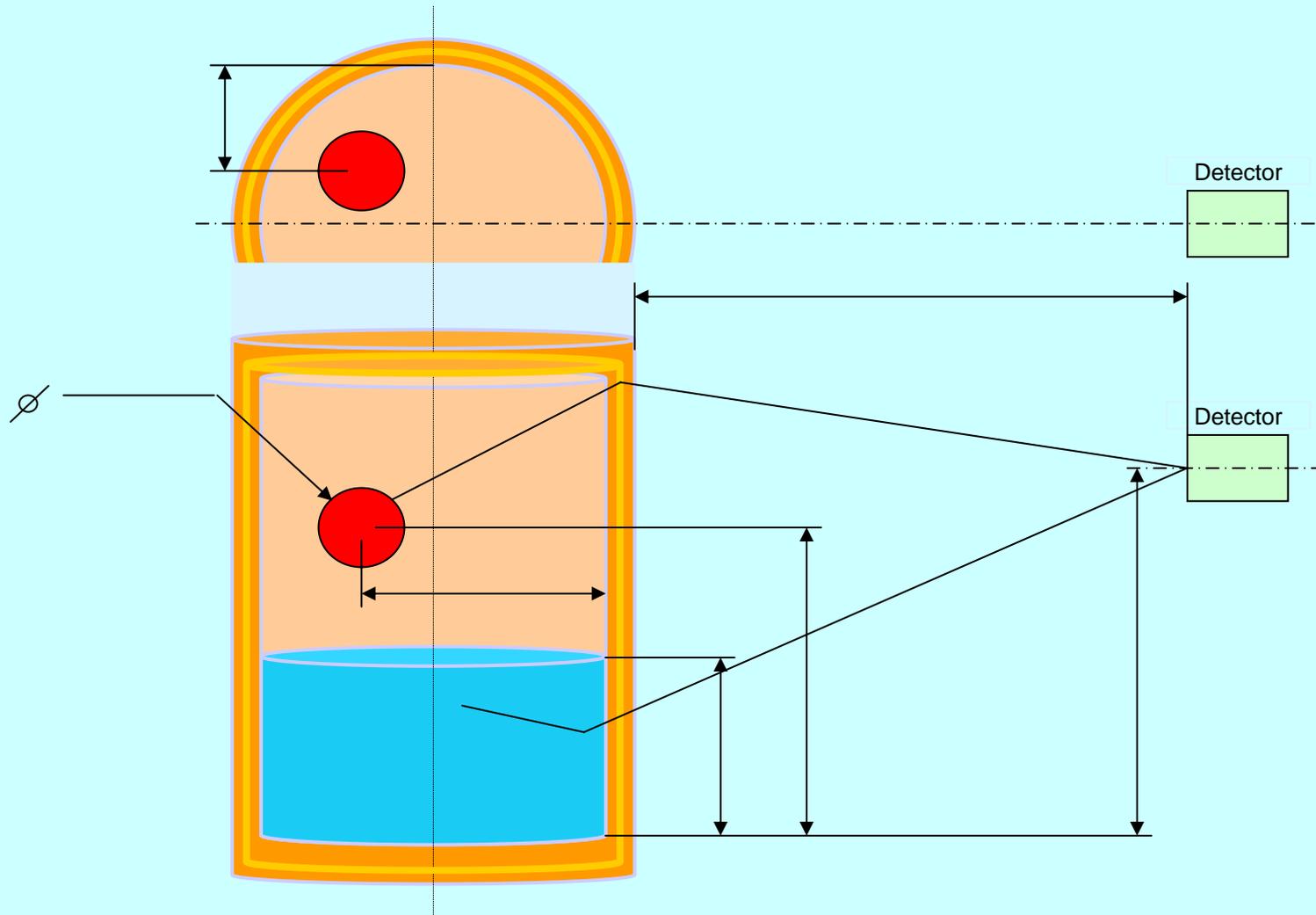
easy to use, fast, accurate dosimetry and shielding calculations for gammas and neutrons using Nucleonica's powerful Monte Carlo engine. Investigate the effects of self-attenuation in the source, build-up effects in the shield etc., on the dose rate and the particle flux distribution at the detector...

NUCLEONICA's easyMonteCarlo web-page showing the currently implemented shielding geometry...

easyMonteCarlo...

An example of the easyMonteCarlo calculation results is shown. The figure demonstrates the photon flux energy distribution from the ^{60}Co source with 10 cm \times 50 cm \times 50 cm iron shield. The source-to-shield and source-to-detector distances are 20 cm and 40 cm respectively. The contributions of the direct and scattered photons to the total flux are indicated on the graph by the red and blue columns respectively.

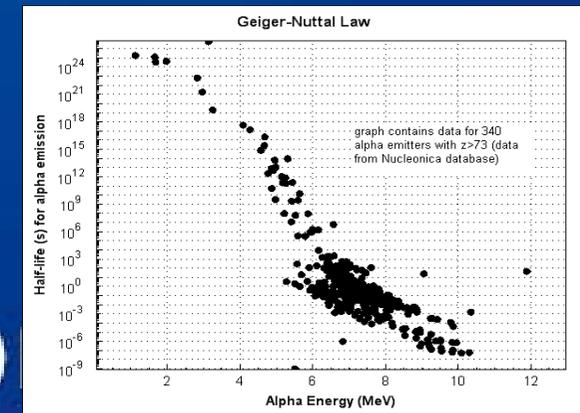
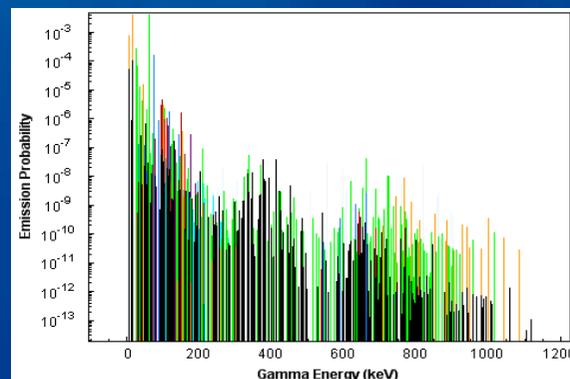
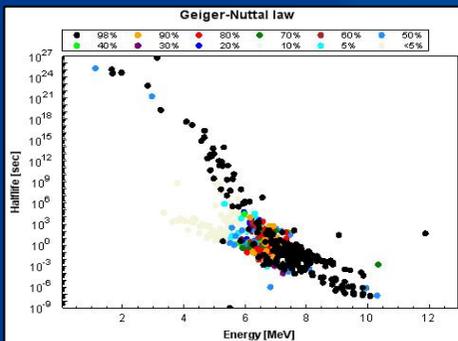
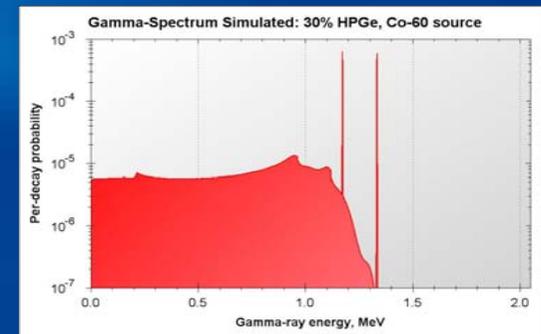
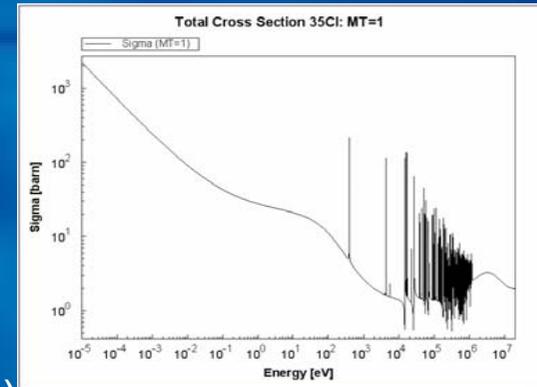




webGraphics...

The Nucleonica webGraphics Features:

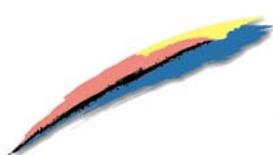
- No need to buy expensive commercial software
- Easy to use
- Delivers publication quality scientific graphs
- Variety of formats available (gif, jpg, emf, eps, png, svg)
- Graphics configuration can be stored for future use
- Available at any time from any location
- Under constant further development



Conclusions: Key Advantages of Nucleonica

- Keep informed with the latest news on nuclear issues
- Use internationally evaluated nuclear data in your work
- Extensive range of nuclear science applications
- Manage all your data in a single browser-based system and keep track of your recent activities
- Prepare a lecture or a training course with Nucleonica materials (graphics, etc.)
- Prepare publication quality scientific graphs
- Stay in contact with your colleagues from previous employment, workshops or conferences
- Meet scientists from your areas of interest and build up an international contact list and represent yourself and your Institute/Organisation in the international science community



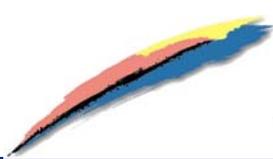


Fold-out Chart & Brochure:

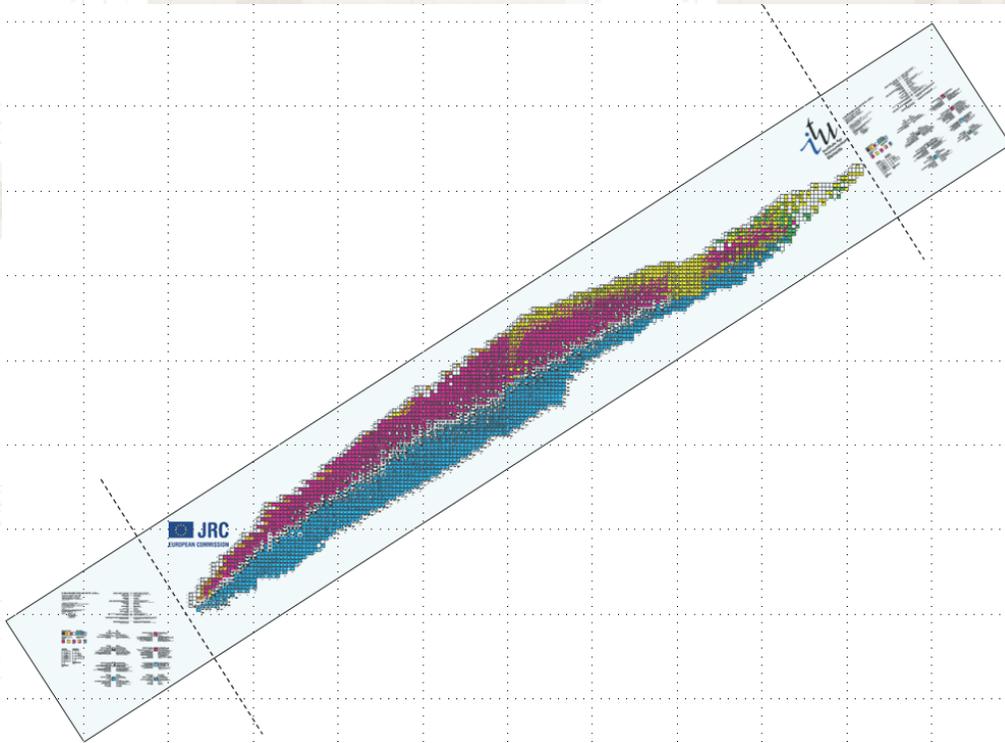


Wall-chart:

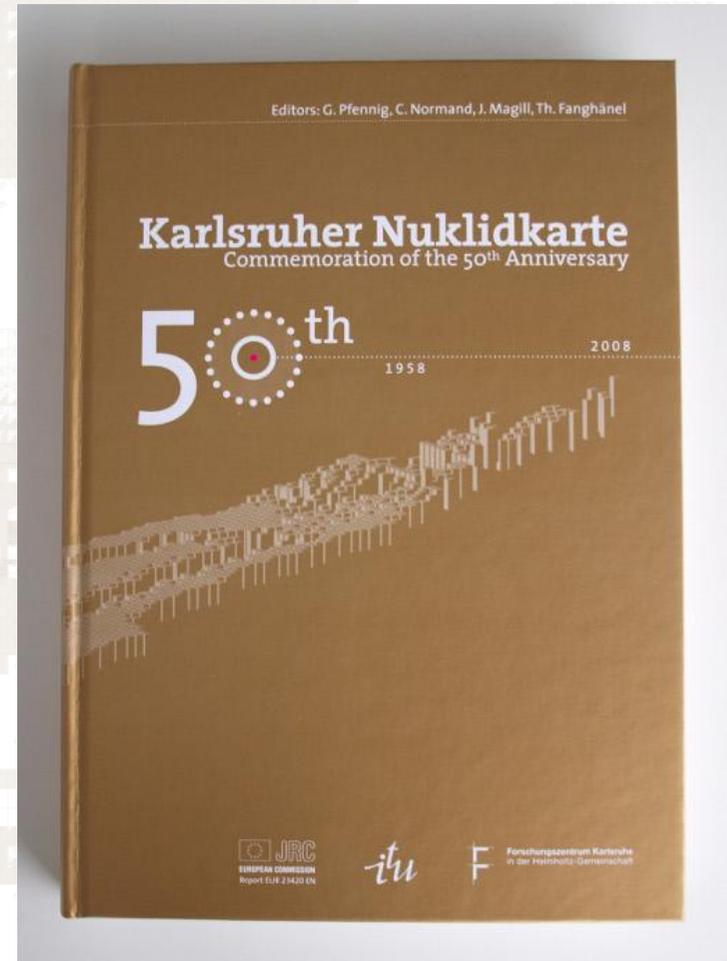




New: "Roll-Chart"



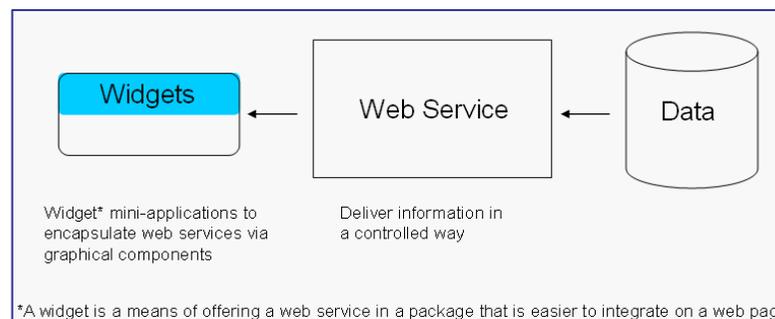
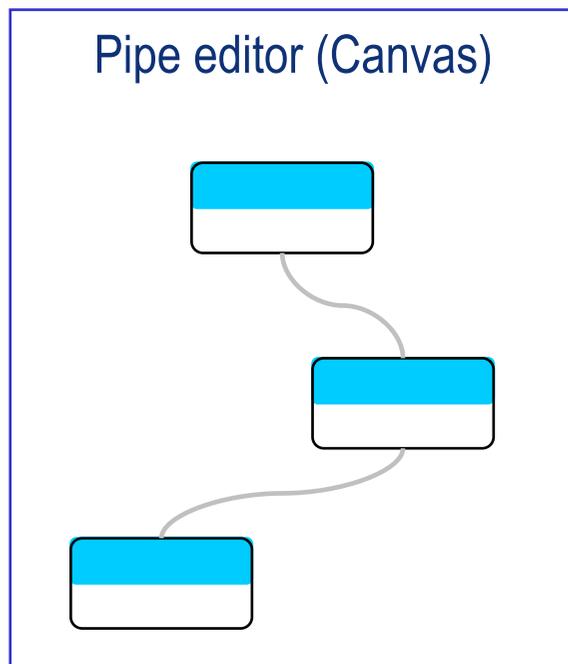
New Publication:



Long-term Vision...

SciencePipes

A New Approach to Knowledge Management, Education and Training based on Modular Web Services



- can be combined from other web services from any location (+)
- can only be called up from anywhere anytime (+)
- combining web services requires no programming knowledge(+)

NUCLEONICA:SNAP Science Networking and Applications Portal

1. What is Nucleonica? Underlying philosophy
2. Nucleonica web portal www.nucleonica.net
3. Social networking aspects
4. Nuclear science applications
5. Training courses
6. Karlsruhe Nuclide Chart
7. Future developments: SciencePipes



Thanks!



nucleonica



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