

LANL Report

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Evaluation and Theory Development

- New fission modeling for Pu236 – Pu244 (PRC paper to be submitted)
- New Iwamoto-Harada model calculation for α -particle emission (CNR11 talk by S. Kunieda, PRC paper submitted)
- Coupled-Channels Hauser-Feshbach method continues (talk at IAEA technical meeting)
- Development of Monte Carlo Hauser-Feshbach method continues
- New MF6 calculations for Ti and As for better energy balance (CoH₃ upgraded)
- V51 new evaluation finalized
- Am241 fission and capture adjusted
- New Pu241 including covariances evaluation underway
- Evaluation of fission spectrum covariances for U235, U238, and Pu239
- New fission product yield evaluations for Pu239
- ... and more

Code Development

- FFD (name TBD) Monte Carlo prompt fission neutron spectra continue
 - combined with the Monte Carlo Hauser-Feshbach code, CGM
- CGM ver.3.4 (Sinope)
 - full MC simulation for neutron and γ -ray emissions from CN
 - application to the fission neutron spectrum
 - two talks given by P. Talou and T. Kawano at CNR11 in Prague
 - incorporation into MCNP
 - talk given by T. Wilcox at ANS meeting
 - application to β -decay study
 - talk given by S. Holloway / T. Kawano at CARIBU workshop

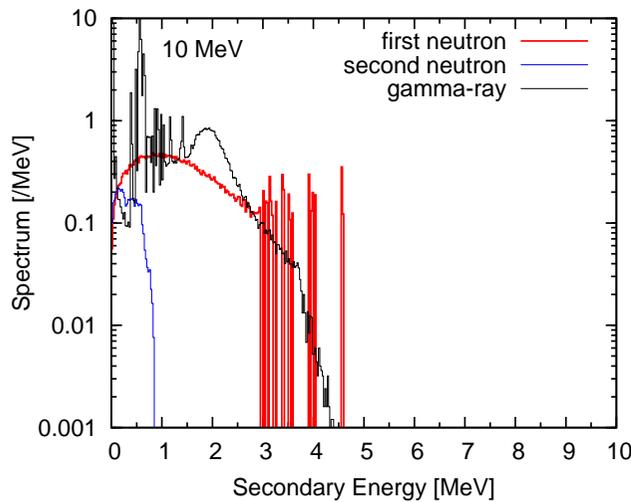
LANSCCE Experiments Activities

- DANCE — neutron capture cross sections, capture-fission ratio, fission *gamma*-ray
 - $^{152,154,155,156,158}\text{Gd}$, ^{97}Mo , $^{184,186}\text{W}$, $^{191,193}\text{Ir}$, $^{233,235,238}\text{U}$, $^{238,239,241}\text{Pu}$, $^{242m,243}\text{Am}$, ^{252}Cf
- GEANIE — reaction cross sections and spectroscopy
 - Sn (combined with GAMMASPHERE), Cu, ^{86}Kr , NaI
- Fission cross sections
 - ^{236}U measured up to 200 MeV
 - TPC: first beam tests in 2010, new measurements start in Nov. 2011
 - SPIDER: spectrometer for ion species determination in fission research
 - LDSD: $^{237}\text{U}(n,f)$ measurement in progress
- Chi-Nu — Neutron emission spectra from fission
 - ^6Li -glass detectors for $E_n < 0.6$ MeV
 - Measure fission neutrons better above 8 MeV
 - Target accuracy is 5% (LA-UR-11-05576)

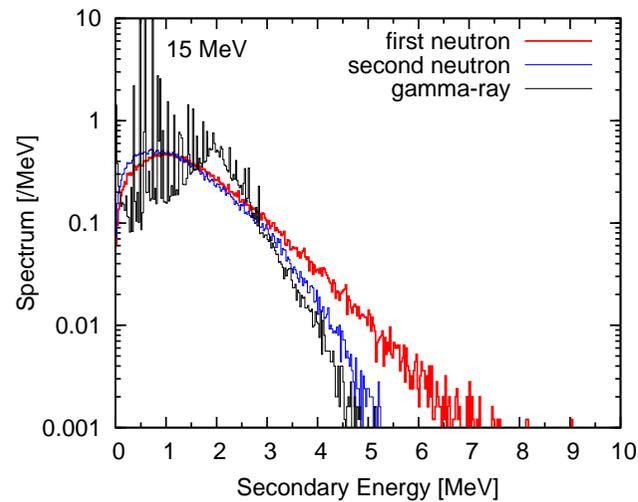
Sequential Neutron Emission

Neutron and gamma-ray emission spectra from excited ^{140}Xe

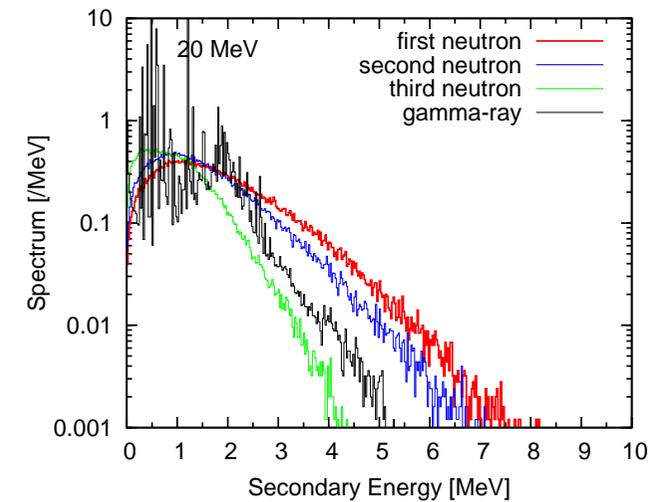
- initial spin distribution by the level density
- 100,000 events — 1 ~ 2 hours on a laptop computer



10 MeV
 $\bar{\epsilon}_\gamma = 0.87 \text{ MeV}$
 $\bar{\epsilon}_n = 1.37 \text{ MeV}$



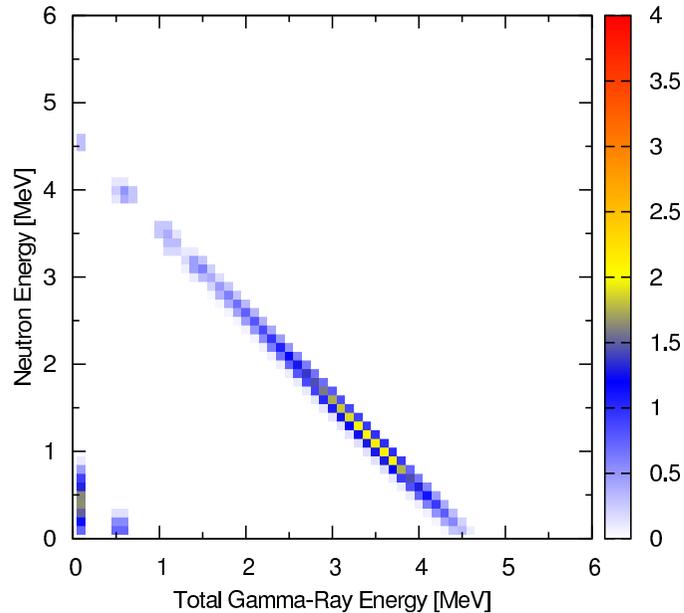
15 MeV
0.89 MeV
1.44 MeV



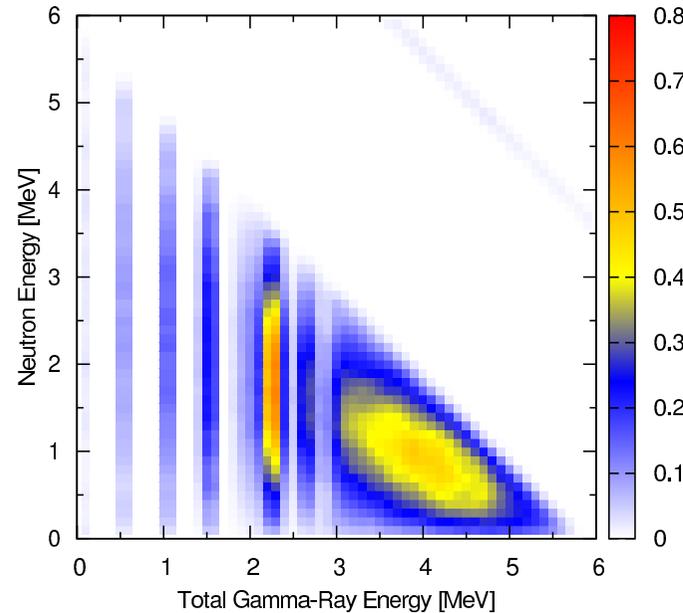
20 MeV
1.06 MeV
1.48 MeV

Correlation Between Gamma Energy and Neutrons

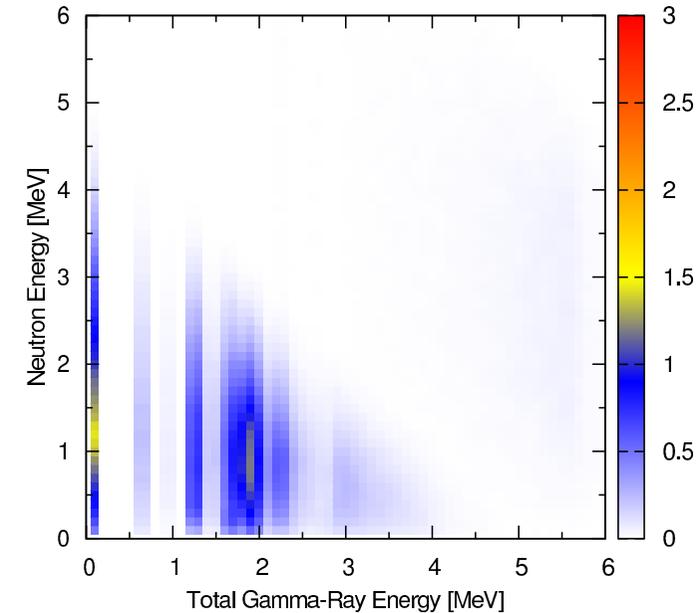
Energy correlation between total γ -ray energy and neutrons from excited ^{140}Xe



10 MeV



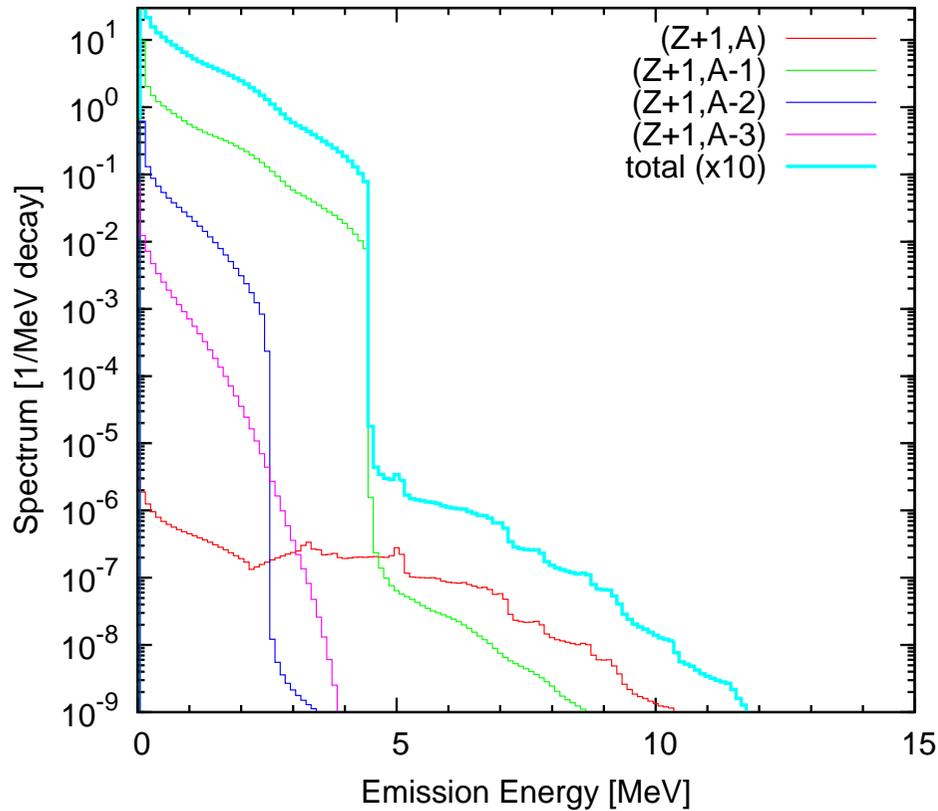
15 MeV



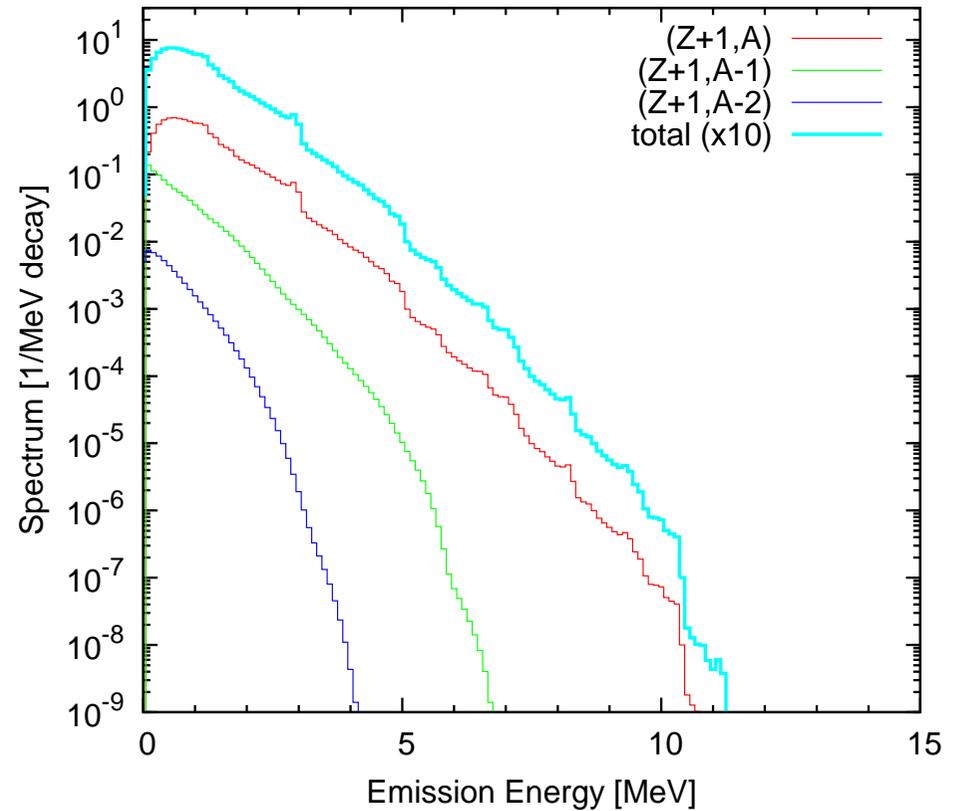
20 MeV

● the joint probability normalized to $[\text{decay, n-MeV, } \gamma\text{-MeV}]^{-1}$

Beta-Decay Calculated Spectra: As-93



Gamma



Neutron

Calculated neutron branching ratios: 1n (93%), 2n (8.5%), 3n (0.5%)

We calculated the delayed neutron and γ -ray spectra for 1412 precursors.

Personnel Change

- S. Kunieda — LTVSM appointment extended, from JAEA Japan
- I. Stetcu — joined T-2, new staff member
- S. Holloway — left T-2, former staff member
- T. Watanabe — left T-2, former postdoc
- B. Perdue — joined LANSCE-NS, new postdoc
- R. Meharchand — joined LANSCE-NS, new postdoc

Manpower Survey (2011)

	Head Count	FTE
Permanent (Theory)	4	0.7
Permanent (Experiment)	3	0.7
Temporary (Theory)	1	0.05
Temporary (Experiment)	1	0.3

Planned Conferences

- Int. Conf. Nuclear Reaction Mechanism, Varenna, June 2012