

SOurce-based NeutroN Irradiation Group Department of Nuclear Physics Lund University

Source Testing Facility: Infrastructure, Data Management and Simulations to Support Detector Tests

Hanno Perrey

DG Jamboree, 5th of September 2016

1 Sources, Detectors and General Infrastructure

2 Data Management and IT Infrastructure

3 Simulations related to the STF

Hanno Perrey (LU)

Source Testing Facility



- user facility for neutron/gamma irradiation studies
- collaboration between DG and LU, operated by Sonnig group
- located in the basement of the physics department at Lund University

The Source Testing Facility at LU



Sources and Detectors

- sources:
 - ▶ gamma
 - (Fe-55, Co-57, Co-60, Ba-133)
 - neutron (Am-241/Be)
 - others available on request
- detectors
 - gamma (LaBr3, CeBr3)
 - neutron (He-3, NE213,...)
- electronics and tools
 - oscilloscopes, MCAs, NIM/VME/CAMAC crates and modules, ...
- moderation and shielding materials
- see inventory and wiki for details
 - everything one needs to put a detector to the test





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DG Jamboree 09.2016 4 / 10

Key Infrastructure: Tagging Neutrons

- Am/Be source provides fast neutron and prompt photon
- detecting both gives neutron time-of-flight (TOF)
- determine neutron energy event-by-event
- neutron energies from $\sim 1 \dots 7 \, {\rm MeV}$
- running 24/7 with four beamports available
- DAQ outputs ROOT files, analysis available
- available as infrastructure for interested users!



source

neutron detector



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IT Infrastructure at the STF

- focus: support experiments!
- network everywhere (WiFi, wired)
- storage server with 6TB RAID
- ELOG server
- 3 general-purpose PCs, plus dedicated DAQ PCs
- remote connection via VPN
- could remote control HV, scopes or any other networked device
- ask for resources you need
- network to clients to server: locally administered!
 - important for lab:
 quick turnaround, hassle-free





Electronic Logbook (ELOG)

- main motivation: keep record, share information
- accessed via browser: https://stf02.nuclear.lu.se
- easily installable at other locations
- customizable input fields and masks: text, numbers, lists, checkboxes, radio buttons
- allows any attachment
- allows scripted submission
- searchable, sortable
- > invaluable for data analysis and reproduction of measurements

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218	56/08/31 14/01	налио Реттеу	Start/Boop	Massament	324	stopped run (concrete aandwich #5)		
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256	16/08/25 13:53	Hanno	Documentation	Meess rement		JLeb semples overview	The markings on the concrete Sometify the englist (in No of each size(e. See types plantic-based (gray, for thermalization)	9
267	16/08/24 14:54	Hanno Perrey	Modification	Measurement	298	New concrete sample: 3.ab sendwich #5	Nut up a nam Handwich (M) cantiting of twa additional blacks of Juke bydrogenaled concrete labeled 3.3 of ed	8.6
206	16/08/22 18:11	Honno Perrey	825.6	Analysis	27 288	E_kin plots and observations of cata	De analysis sais het het langely rearites Grand office_analysis' in bishocket repeatency o science atta	11x 8

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Simulations related to the STF

- disclaimer: have not run simulations myself (yet)
- this lists only what I am aware of
- detectors
 - efficiency calculations for liquid scintillators (STANTON)
- sources
 - Am/Be: ISO 8529-2 and TOF
- Aquarium/neutron time-of-flight
 - Aquarium modeled for Geant4 (John Annand)
 - Doug Di Julio working on nTOF through shielding
- moderator block
 - STF one based on design by Dorothea Pfeiffer
 - simulations exist (where?)



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Plans/needs for simulations

- Sonnig moving towards tagging thermal neutrons
- experimentally challenging
- simulations important for experiment design and concept
- simulation work towards this ongoing (J. Annand)

Other items:

 larger detectors might require to simulate light propagation





Conclusion

- STF has locally administered IT infrastructure in place to support measurements
- big help in understanding your data later: keep an ELOG
- more and more components are being simulated but results/state not yet centrally documented
- fast neutrons moving towards tagging thermal neutrons