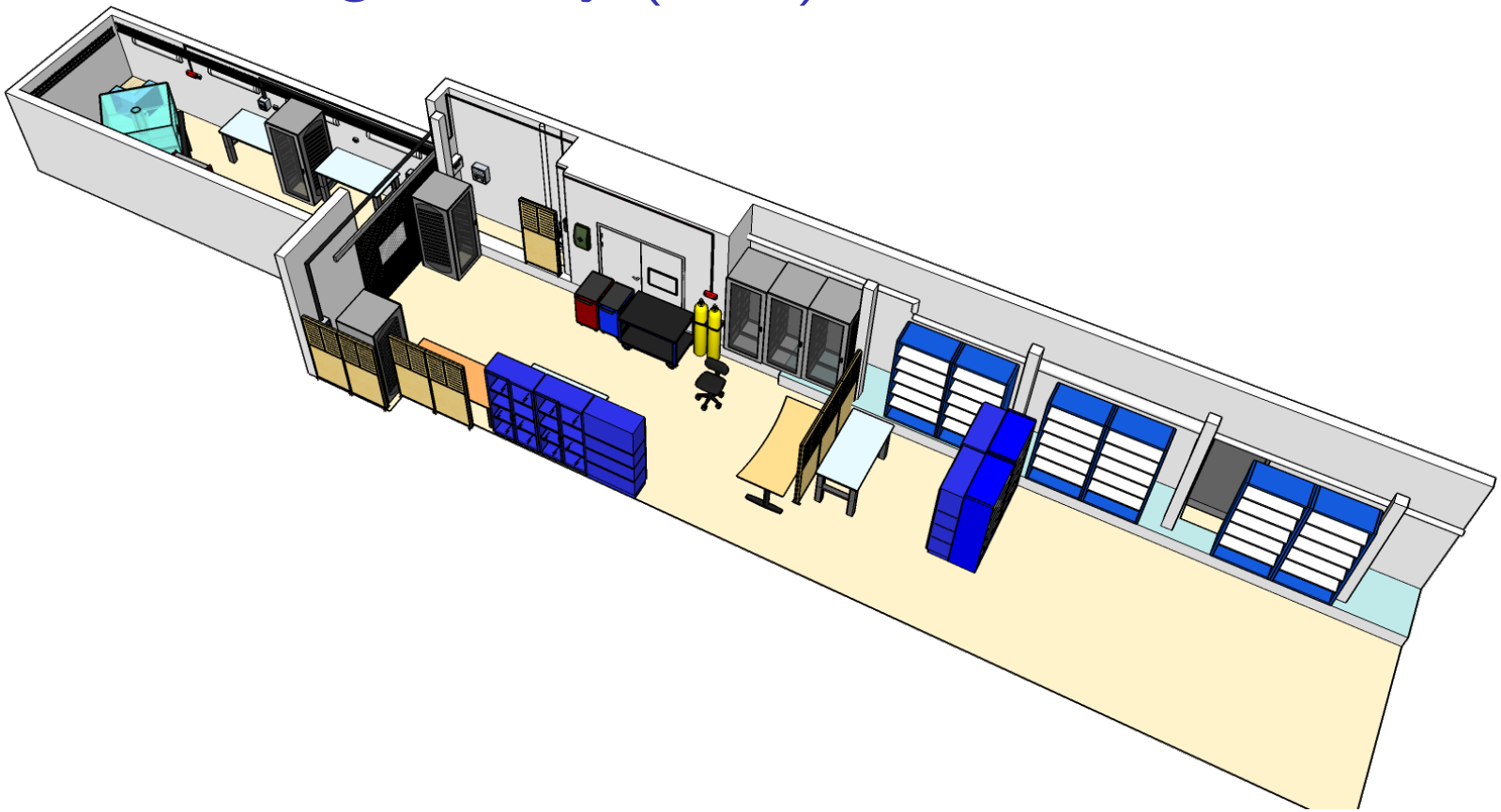
SOurce-based NeutroN Irradiation Group
Department of Nuclear Physics
Lund University

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

Hanno Perrey

DG Jamboree, 5th of September 2016

The Source Testing Facility (STF)



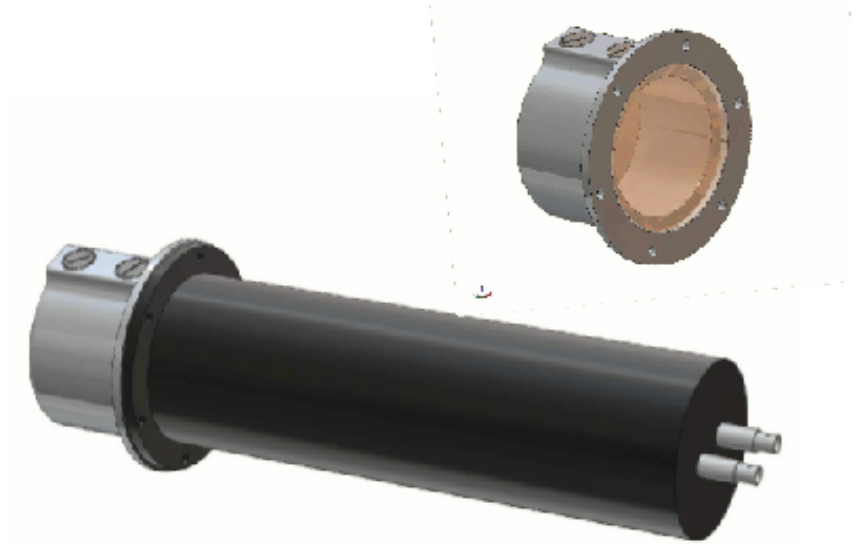
- user facility for neutron/gamma irradiation studies
- collaboration between DG and LU, operated by Sonnig group
- located in the basement of the physics department at Lund University

The Source Testing Facility at LU

Sources and Detectors

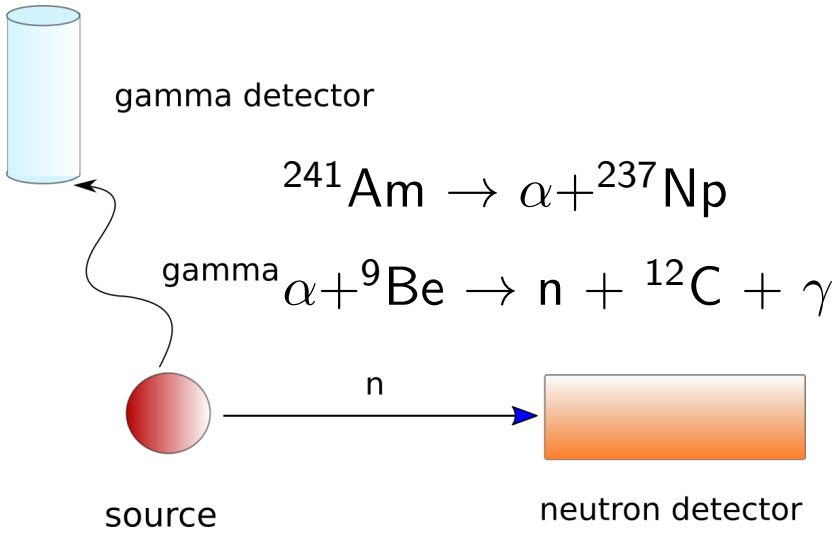
- sources:
  - gamma (Fe-55, Co-57, Co-60, Ba-133)
  - neutron (Am-241/Be)
  - others available on request
- detectors
  - gamma (LaBr3, CeBr3)
  - neutron (He-3, NE213,...)
- electronics and tools
  - oscilloscopes, MCAs, NIM/VME/CAMAC crates and modules, ...
- moderation and shielding materials
- see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

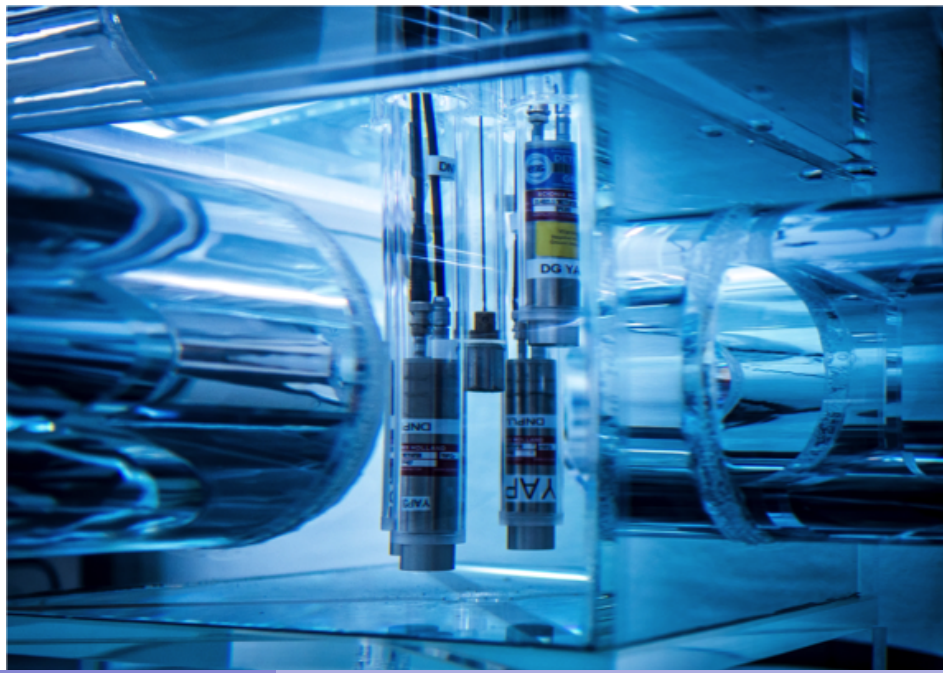
⇨ everything one needs to put a detector to the test



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 $\sim 1 \ldots 7\,\mathrm{MeV}$
- running 24/7 with four beamports available
- DAQ outputs ROOT files, analysis available
- available as infrastructure for interested users!





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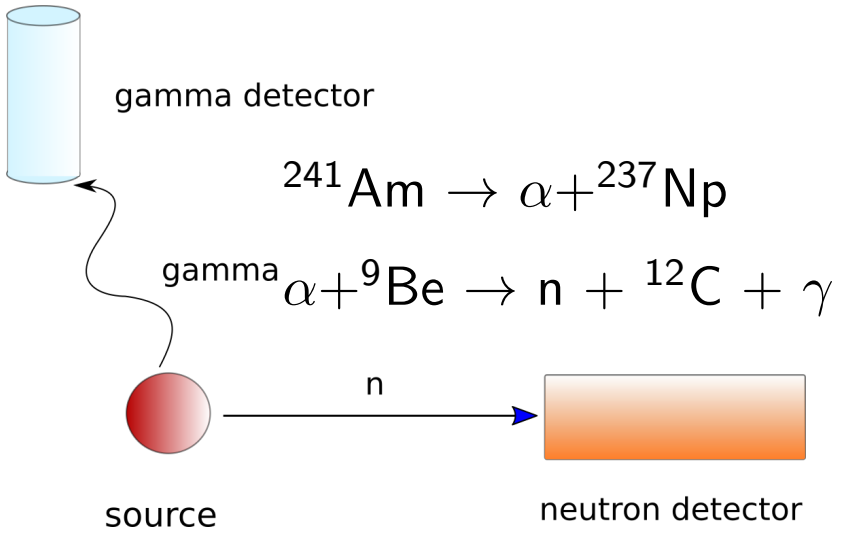
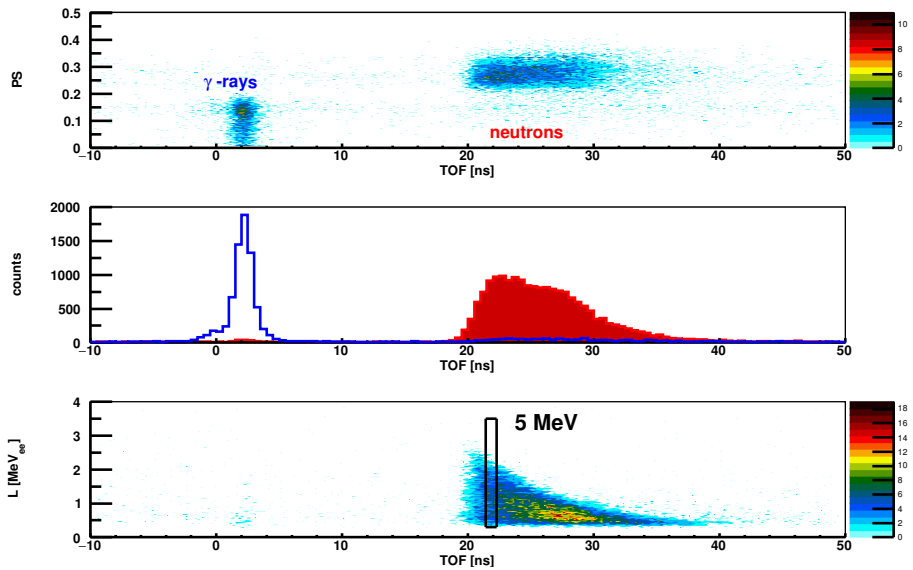
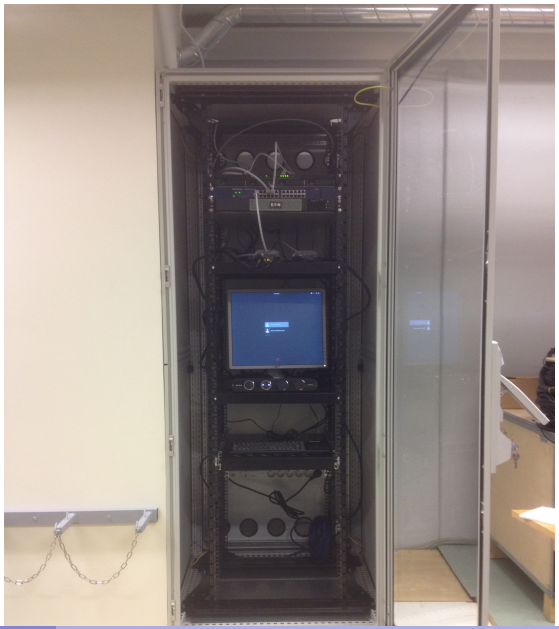




IT Infrastructure at the STF

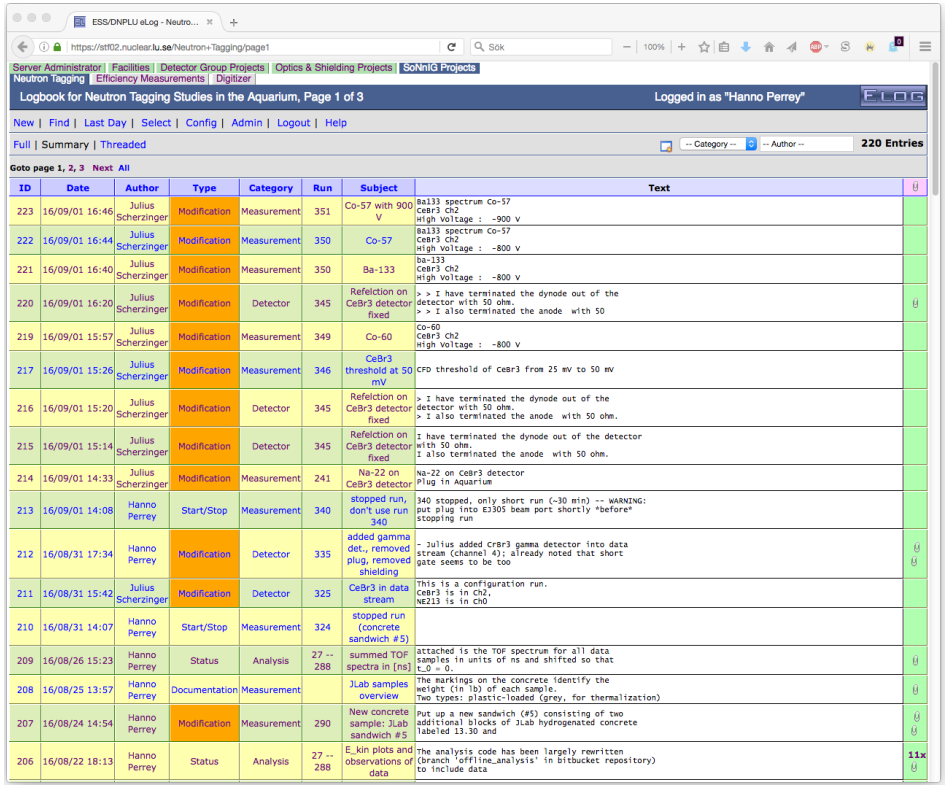
- focus: support experiments!
- network everywhere (WiFi, wired)
- storage server with 6TB RAID
- ELOG server
- 3 general-purpose PCs, plus dedicated DAQ PCs
- remote connection via VPN
- could remote control HV, scopes or any other networked device
- ask for resources you need
- network to clients to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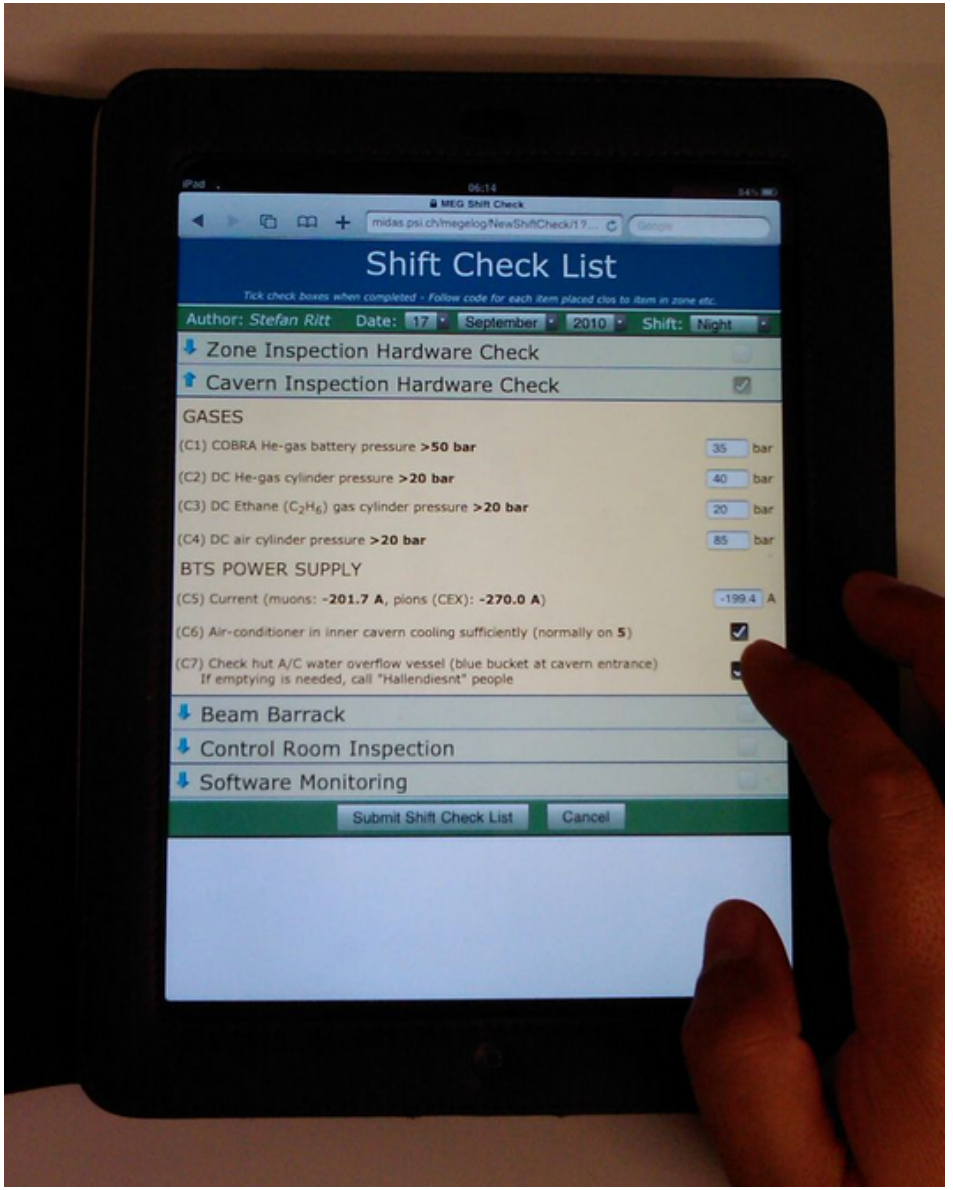
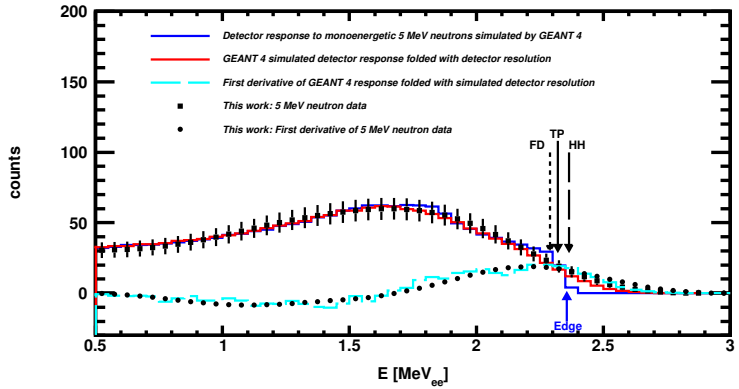
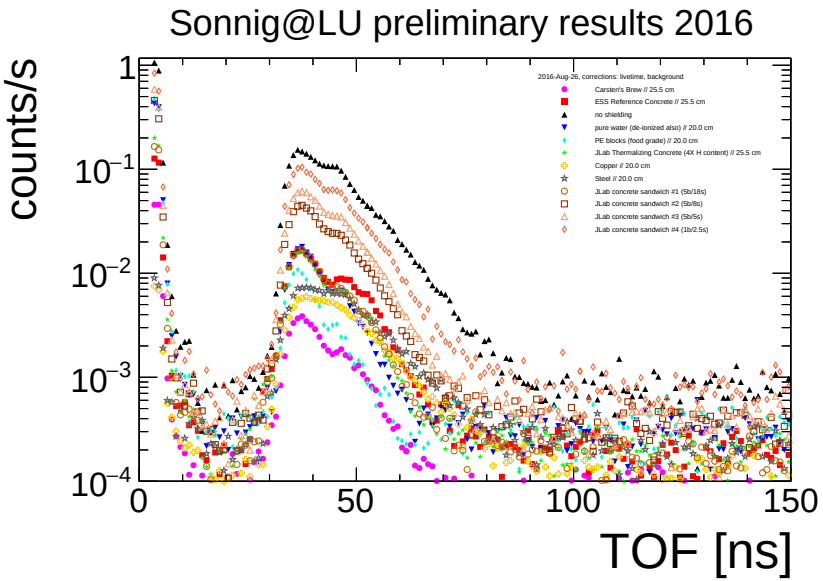


Simulations related to the STF

- 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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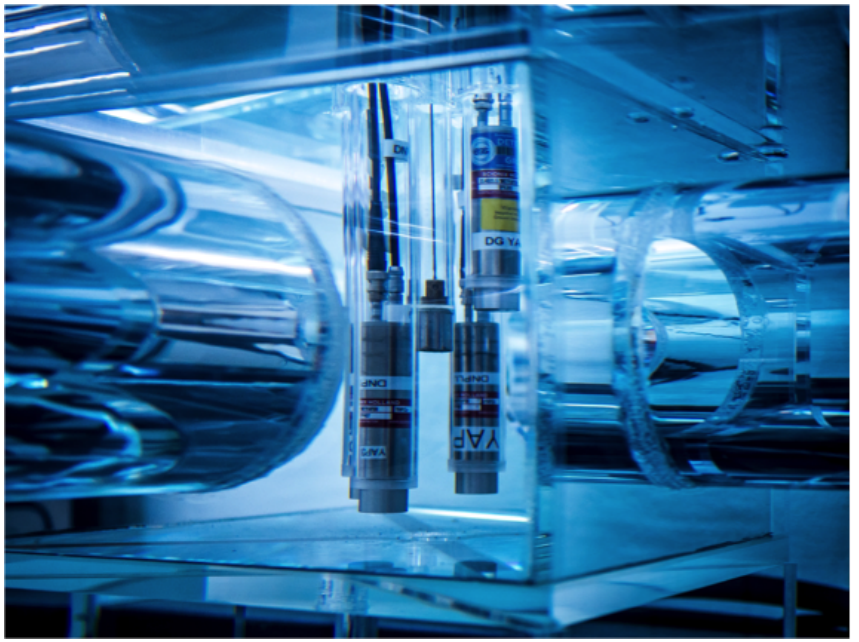
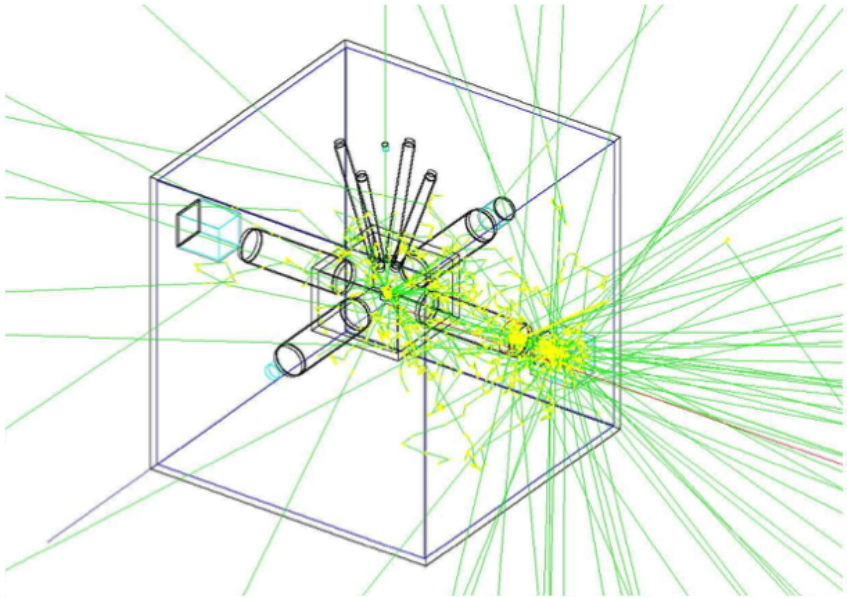
Plans/needs for simulations

- 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