



BRR – BNC-AEKI

ACCESS Activity presentation
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March 31, 2009



Budapest Research Reactor 50!

Full scale reconstruction completed in 1993

Operation can be foreseen until 2023

Core conversion

Budapest Neutron Centre – important regional position

Facilities in the reactor hall:

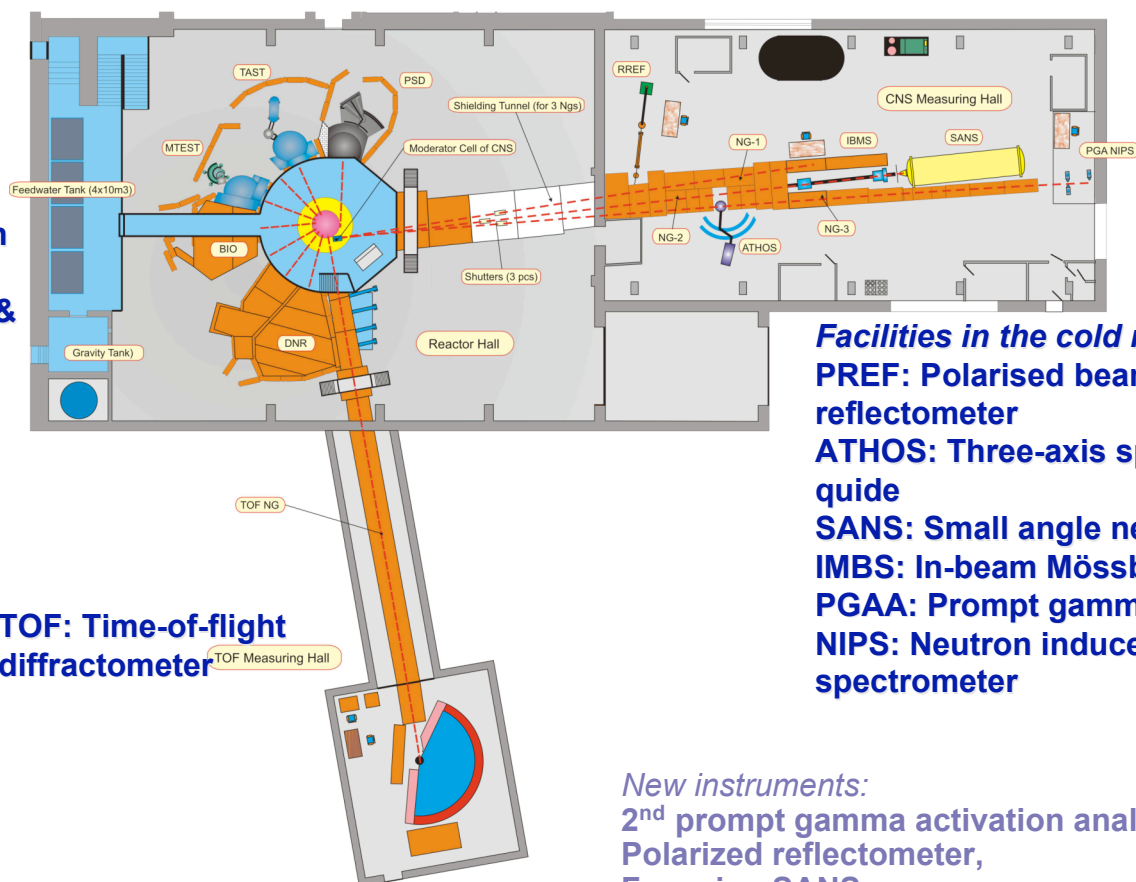
BIO: Biological irradiation station

RAD: Dynamic n/gamma & static radiography

MTEST: Material test diffractometer

TAST: Three-axis spectrometer on thermal beam

PSD: Powder diffractometer



TOF: Time-of-flight diffractometer

Facilities in the cold neutron measuring hall:

PREF: Polarised beam neutron reflectometer

ATHOS: Three-axis spectrometer on neutron guide

SANS: Small angle neutron scattering

IMBS: In-beam Mössbauer spectrometer

PGAA: Prompt gamma activation analysis

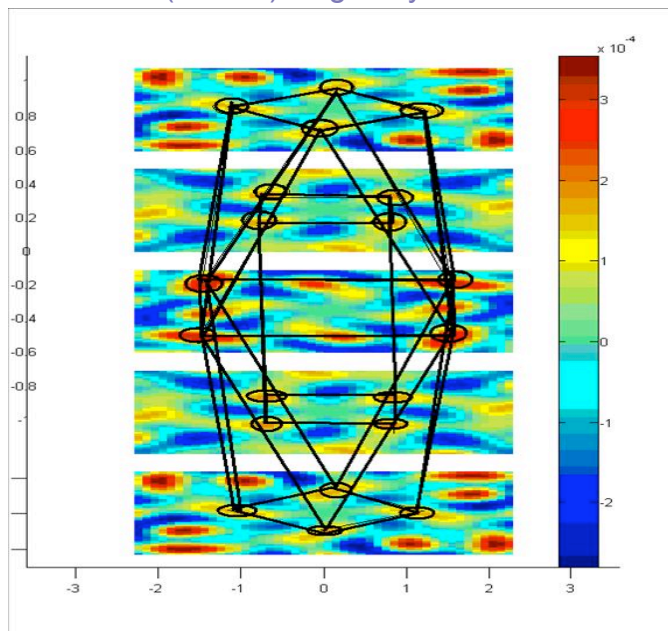
NIPS: Neutron induced prompt gamma spectrometer

New instruments:

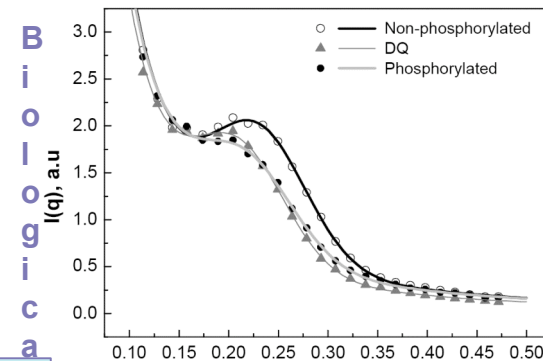
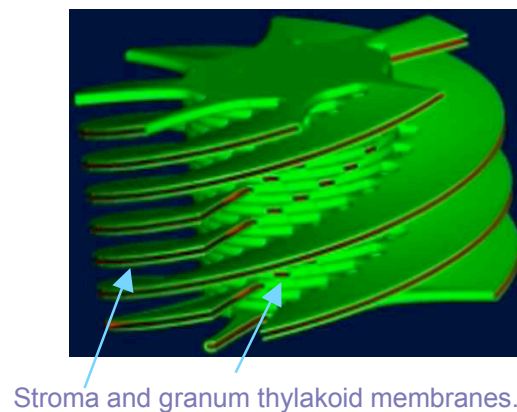
2nd prompt gamma activation analysis,
Polarized reflectometer,
Focusing SANS

TAST

Holographic measurement on ammonium-chloride (NH₄Cl) single crystal



SANS applications



Radially averaged SANS data on magnetically aligned thylakoid membranes at different steps of the phosphorylation process.

Nuclear



Research Reactor Control Rod Measurement



Key features of the Budapest PGAA-NIPS station

- Main topics: elemental analysis of samples using prompt-gamma activation analysis (PGAA) or neutron induced prompt gamma-ray spectroscopy (NIPS)
- Thermal equivalent flux
 - PGAA: in air: $1.2 \times 10^8 \text{ cm}^{-2} \text{ s}^{-1}$, in vacuum: $1.5 \times 10^8 \text{ cm}^{-2} \text{ s}^{-1}$
 - NIPS: in air: $3.0 \times 10^7 \text{ cm}^{-2} \text{ s}^{-1}$, in vacuum: $4.7 \times 10^7 \text{ cm}^{-2} \text{ s}^{-1}$
- Low background, excellent signal-to-background ratio
- High dynamic range
- Modular and flexible setup: non-destructive analysis of large samples is also possible
- Automation of the PGAA station is in progress, NIPS will be upgraded with a Compton-suppressor
- Combination of spatially-resolved PGAA with neutron radiography/tomography: PGAI-NT (prompt-gamma activation imaging with neutron tomography)

Looking inside objects with PGAI-NT

(prompt-gamma activation imaging with neutron tomography)

Copper balls

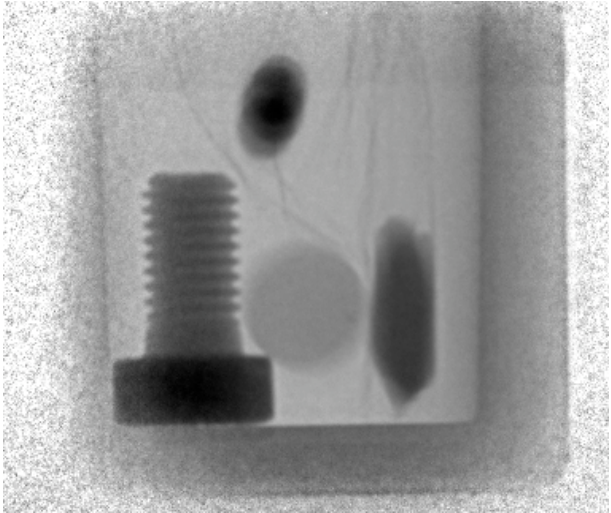
Aluminum cylinder



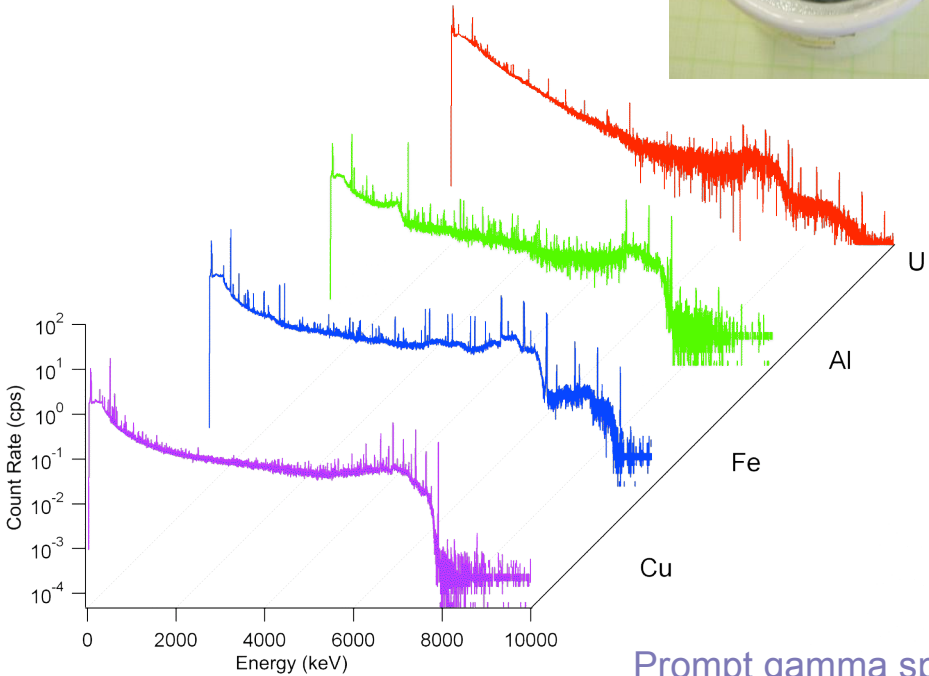
Natural Uranium oxide

Fe screw

... within a Pb container



Neutron radiography



Prompt gamma spectra



Strategy for the future

- Is there a possibility to reinforce the strength of your facility through a common strategy?

Project management, coordination,
User database,
Instrumentation,
Data evaluation, management.

- Would a topical focus make sense ?

Nuclear technology: Nuclear reactor - aging
 Fusion equipment materials

- Your point of view regarding integration with other fields (eg laser)

On specific areas:

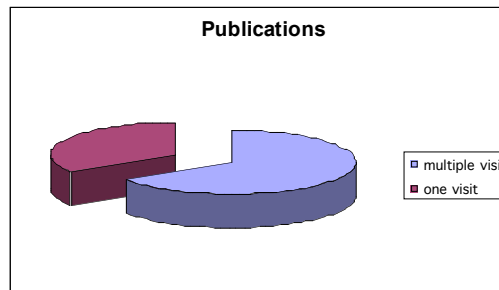
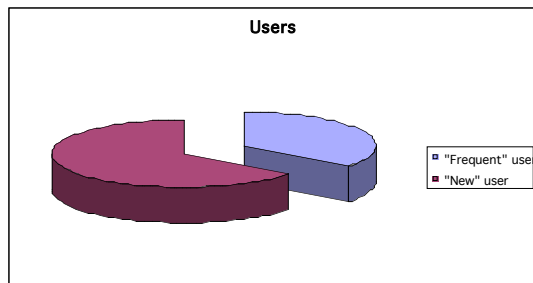
Biological research: membranes
Polymers



Our place in Europe

■ Statistics on user frequentation / outcome in terms of publications?

BNC is an important ground for training young scientist, newcomers, for developing instrumentation, and for conducting „early phase „ experiments.



■ Common user data management (eg. ISIS, PSI, ILL)?

How can we (the small centre) join to the common user data management?
What are the large centres suggestions in this regards?

■ Neutron & Muon community management (eg. study on publications)?

To prepare a survey on the future trend of the equipment developments.